

POPULAR MECHANICS' *Famous*

Howard D. Bell

CONCRETE BLOCK HOUSE

Save money-build this house yourself!



Yes—you can build this modern home yourself and save many hundreds of dollars. Five rooms—living room, two bedrooms, utility room and beautiful cabinet kitchen—approximately 674 sq. feet of comfortable living space. Poured concrete floors and concrete-block walls, plus a hip roof, simplify construction so any inexperienced man can build this well-insulated home

By James R. Ward
Craftsman Editor, Popular Mechanics Magazine

COMPLETE PLANS, DETAILED DIAGRAMS AND
STEP-BY-STEP DESCRIPTION TELL YOU HOW
TO BUILD THIS MODERN HOME YOURSELF

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POPULAR MECHANICS

Famous

Howard F. Snell
Roseville 1954-

F. Mansberger 8/2002
27.00

CONCRETE BLOCK HOUSE

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MATERIAL LIST

Total cost based on 1948-49 prices in Chicago area—\$3623.36

MASONRY—Total Cost \$933.78

Blocks—Total Cost \$433.45

Foundation

435 8x10x16 (concrete) @ 30c.	\$130.50
Bearing-Wall Foundation	
72 8x12x16 (full blocks) @ 32c.	23.04

Bearing Wall

202 8x8x16 (full blocks) @ 21c.	42.42
41 8x8x8 (half blocks) @ 12c.	4.92

Exterior Walls

Front	
155 8x8x16 (full blocks) @ 21c.	32.55
41 8x8x8 (half blocks) @ 12c.	4.92
Rear	
199 8x8x16 (full blocks) @ 21c.	41.79
29 8x8x8 (half blocks) @ 12c.	3.48
Left Side	
175 8x8x16 (full blocks) @ 21c.	36.75
18 8x8x8 (half blocks) @ 12c.	2.16
Right Side	
149 8x8x16 (full blocks) @ 21c.	31.29
26 8x8x8 (half blocks) @ 12c.	3.12
Full Corner Blocks	
48 8x8x16 @ 21c.	10.08

Interior Walls

Wall A— 96 4x8x16	
Wall B— 78 4x8x16	
Wall C— 103 4x8x16	
Wall D— 30 4x8x16	
Wall E— 26 4x8x16	
Wall F— 74 4x8x16	
Wall G— 13 4x8x16	
Wall H— 91 4x8x16	
Total 511 4" blocks @ 13c.	66.43
Mortar for laying blocks (\$2.75 per 100 blocks).	55.00
Footings (foundation) concrete	
152 lineal ft. of 12"x24" footing	
1 1/4 cu. yds. @ \$6.00 cu. yd.	67.50
Floor (832 sq. ft. x 4" thick) 9 1/2 cu. yds. @ \$6.00 cu. yd.	57.00
Stoops (front and rear)	
16 sq. ft. with 18" footings, 1 1/2 cu. yds. @ \$6.00 cu. yd.	8.00
Window sills and chimney cap	
1/2 cu. yd. @ \$6.00 cu. yd.	3.00
Reinforcing wire mesh, 810 sq. ft. @ \$3.15 per 100	25.50
Membrane damp-proofing (Sisalkraft), 810 sq. ft.	12.50
Rigid insulation for floor, edge, (116 lineal ft. x 4" wide).	9.28
Rigid insulation, border, 210 sq. ft.	45.00
Stucco	150.00
Asphalt waterproofing for foundation	
20 gal. @ \$2.75 per 5 gal.	11.00
Drain tile around foundation	
130 lengths of 4"x12" @ 11c.	14.30

Chimney

544 Common brick @ 3c.	16.32
144 Face brick @ 4 1/2c.	6.48
8 Lengths 8x12x24 flue lining @ \$1.60.	12.80
1 Cleanout door (steel).	1.25
1 Flue thimble	.40
Copper chimney flashing.	5.00

ROOF—Total Cost \$568.42

Wall Plates (exterior)

6 2x8x16' 0"	
2 2x8x10' 0"	
116 lineal ft. @ 16 1/2c per ft.	\$ 19.14
Bearing-Wall Plate	
1 2x4x10' 0"	
2 2x4x12' 0"	
34 lineal ft. @ 8c per ft.	2.72

Ceiling Joists

23 2x6x16' 0"	
23 2x6x12' 0"	
1 2x6x8' 0" (chimney and stairwell framing)	
652 lineal ft. @ 12 1/2c per ft.	81.50

Bridging

53 lineal ft. 2x6 @ 12 1/2c per ft.	6.63
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Rafters

18 2x6x16' 0" Gable rafters	
1 2x6x12' 0" Ridge board	
4 2x6x18' 0" Hip rafters	
2 2x6x12' 0" Gable rafters (ends)	
1 2x6x2' 0"	
3 2x6x3' 0"	
10 2x6x4' 0"	
12 2x6x6' 0"	
8 2x6x8' 0"	
13 2x6x10' 0"	
9 2x6x12' 0"	
2 2x6x14' 0"	
1 2x6x8' 0" Chimney framing	
881 lineal ft. @ 12 1/2c per ft.	110.12

Roof Boarding

1000 sq. ft. 1x6 @ \$115.00 per 1000 sq. ft.	115.00
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Roof Louvers (Montgomery Ward & Co.)

2 roof type @ \$2.10.	4.20
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Cornice

(No. 1 grade white pine)	
120 lineal ft. of 1x6 (for facia) @ 18c.	21.60
120 lineal ft. of 1x2 (for crown) @ 6c.	7.20

Anchor Bolts for Wall Plates (Montgomery Ward & Co.)

40 1/2x8" machine bolts @ 78c per 10.	3.12
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Attic Flooring

400 lineal ft. of 1x6 flooring @ 11 1/2c.	46.00
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Asphalt Roofing (Sears, Roebuck & Co.)

3-in-1 (12"x36") 215 lb. wt. shingles	
1 bundle covers 33 1/2 sq. ft.	
30 bundles @ \$2.25	67.50
3 rolls asphalt ridge strip 9"x36 ft. @ 73c.	2.19
18 lbs. galv. shingle nails, 1 1/4" @ 18c.	3.24

Insulation (Sears, Roebuck & Co.)

9 rolls blanket insulation (1 roll covers 75 ft.)	51.75
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Gutter and Fittings (Montgomery Ward & Co.)

12 5"x10 ft. lengths galv. eaves trough @ 95c.	11.40
4 5" outside corners @ 69c.	2.76
2 Drop outlets 5" for 3" downspout @ 55c.	1.10
4 3" elbows @ 43c.	1.72
36 Trough strap hangers 5" @ \$1.03 doz.	3.09
18 Slip-joint fasteners for 5" trough @ 21c.	3.78
4 Downspout pipe bands, 3" @ 7c.	.28
2 Pipe strainers @ 20c.	.40
2 Downspout pipe, 3"x10 ft. @ 99c.	1.98

PLUMBING—Total Cost \$532.61

Pipe and Fittings

2 Roof flanges @ \$4.00	\$ 8.00
2 Increases (1 tapped) @ \$4.25.	8.50
7 90-deg. 1 1/2" galv. elbows @ 70c.	4.90
2 4"x2" reducer @ 90c	1.80
3 Quarter bends 4" @ \$1.85.	5.55
4 1 1/2" galv. pipe tees @ 90c.	3.60
1 Drum trap 4"x8" @ \$4.00.	4.00
2 Eighth bends 4" @ \$1.85.	3.70
1 Closet bend 4" @ \$3.00.	3.00
1 Cleanout tee 4" @ \$4.50.	4.50
2 Sanitary tapped "T" branches 4" @ \$1.35.	2.70
3 "Y" branches 4" @ \$2.75.	8.25
1 Sanitary "T" 4"x4" @ \$2.75.	2.75
24 5-ft. lengths of 4" cast-iron soil pipe.	25.20
1 Sanitary "T" for closet connection @ \$4.85.	4.85
34 lineal ft. of 1 1/2" galv. pipe @ 35c.	11.90
100 lineal ft. of 1/2" galv. pipe @ 18c.	18.00
14 1/2" galv. elbows @ 14c.	1.96
8 1/2" galv. tees @ 12c.	.96
1 1/2" union.	.55

Bathroom Fixtures (Montgomery Ward & Co.)

1 5-ft. cast-iron bathtub	\$ 58.95
1 tub faucet	9.95
1 overflow fitting (chain and stopper type)	5.25
1 lavatory (17"x19") with faucets.	22.00

(Continued on other side of sheet)

Foreword

Dedicated to the man who likes to do things with his hands and gets much enjoyment from a job well done, even though it may require many hours of hard work, this book describes step by step the construction of a five-room, concrete-block house from the first shovelful of soil for the foundation excavation to the last swipe of the paintbrush. Here the reader will find the answer to the problem of owning an attractive, comfortable home on a fairly small investment, and also the type of construction that is easiest for the amateur builder to understand and put into practice.

Even though the description and details cover only one house, it is the belief of the author that, after a careful study of the plans and information given, the average handyman can adapt the information to building any concrete-block structure of medium size, whether it be only a simple shower stall or another home of different size and shape. The builder is not necessarily confined to block construction as the design of the house lends itself beautifully to the use of brick or any of the many imitation types of stone available today.

Tools for constructing the house are of the simplest type and inexpensive—a couple of handsaws, two shovels, hammers, a carpenter's level, etc., will just about take care of the job. Concrete for the footings and floors can be mixed by hand, but rental of a small concrete mixer will save enough labor to make the small expenditure well worthwhile.

The floor plan is flexible, of course, and can be changed somewhat to suit individual tastes, but if this is done, the author advises that you build a small model of the house and incorporate the desired changes. The model can be made from heavy cardboard or thin plywood to a scale of $\frac{1}{2}$ in. to the foot, or even larger scale. Building the model may save much disappointment and many dollars as it will enable any inexperienced person to visualize the home full size and thus decide whether or not the desired changes are satisfactory.

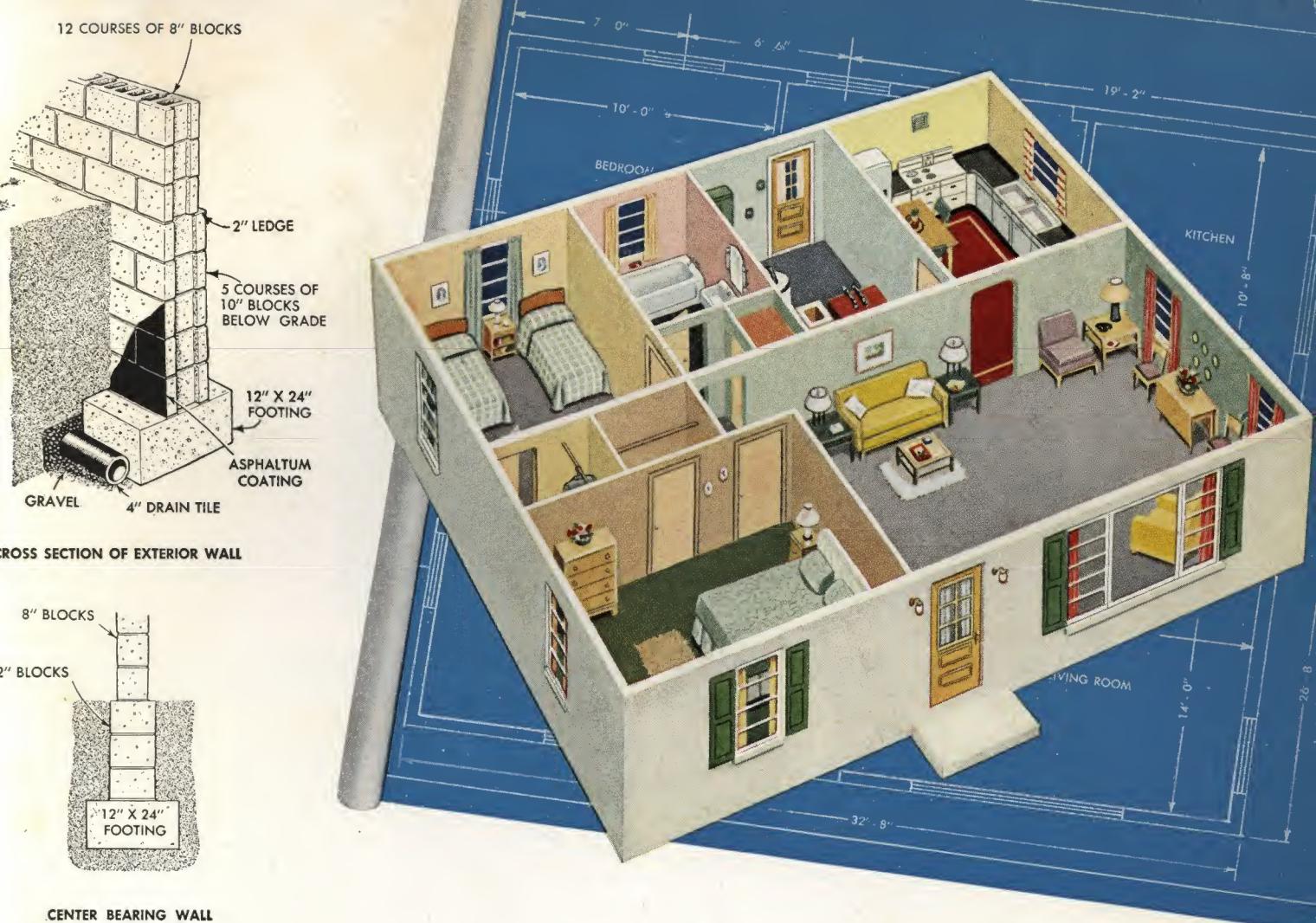
James R. Ward

CRAFTSMAN EDITOR

POPULAR MECHANICS MAGAZINE



This dream home in stuccoed masonry, consisting of cabinet kitchen, two bedrooms, living room, bathroom and utility room, complete with laundry and heating plant, is yours for less than \$3650 if you build it yourself. Block construction is within the ability of an average man

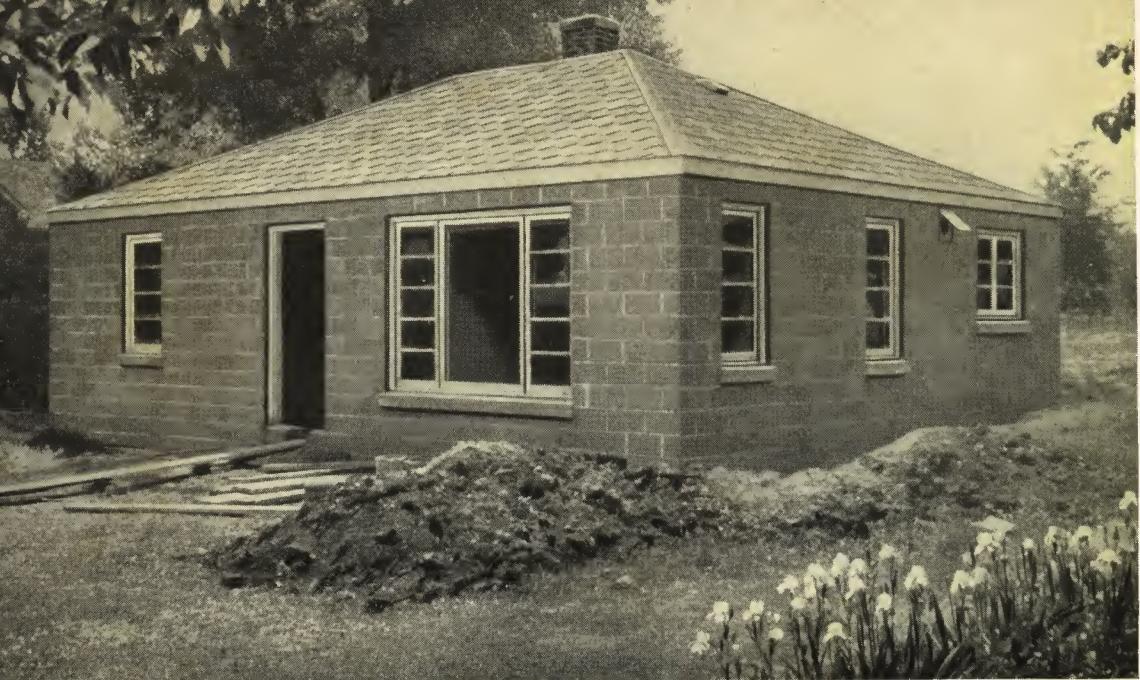


CENTER BEARING WALL

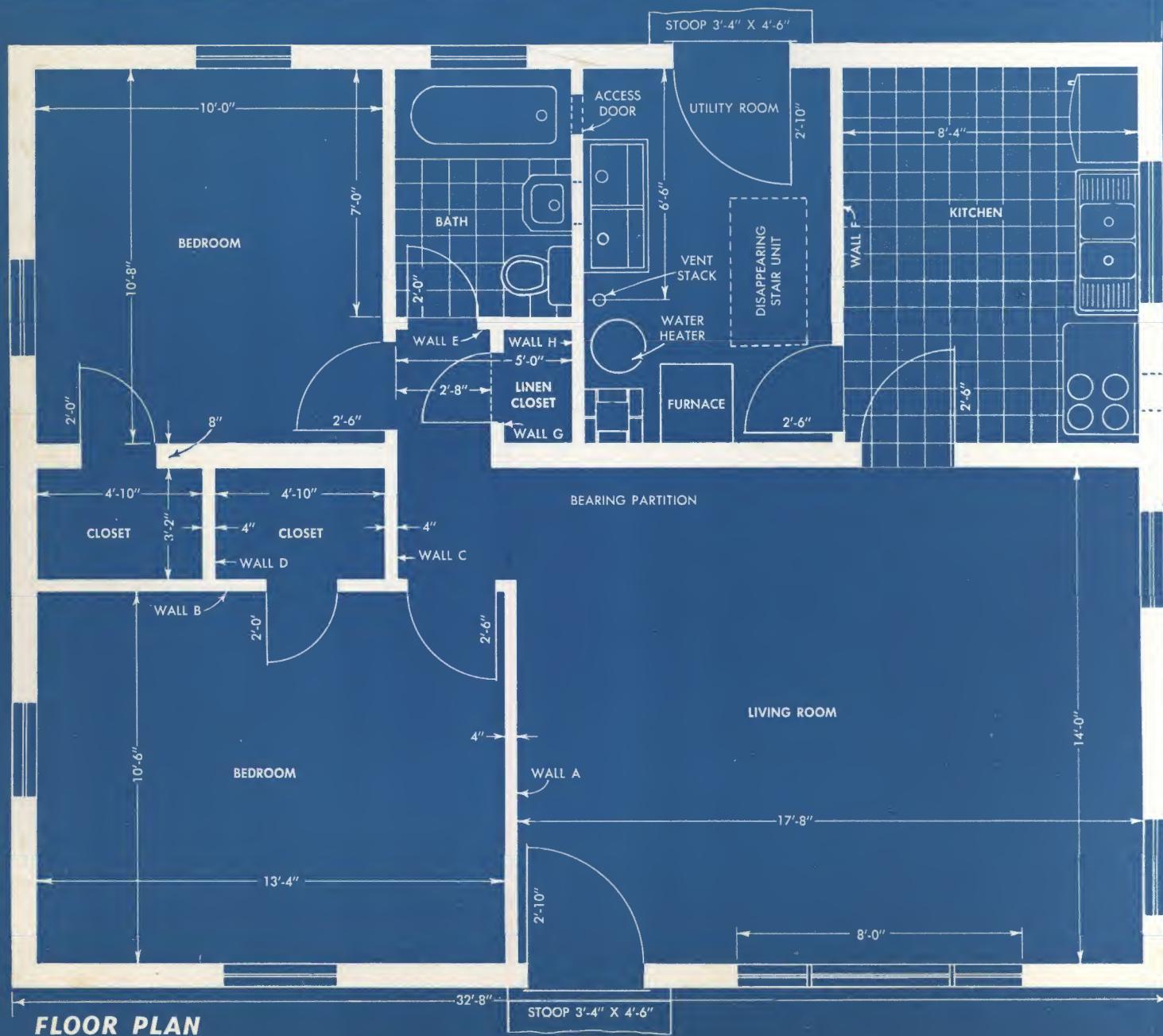
PROBABLY by no other means is it possible for the average man to get so much home for the money as he can have by building this beautiful concrete-block house himself. And it is a beautiful home with plenty of room for a family of four as evidenced by the cutaway view above. There is a large cozy living room, two bedrooms that will accommodate three-piece suites with space to spare, a bathroom, a utility room for heating plant and laundry, and a cabinet kitchen large enough to take a breakfast set. It was actually built as pictured minus furniture but complete with a gas-fired, hot-air heating plant, laundry tubs, kitchen cabinets and sink, and a complete bathroom ready to move into at a cost for materials of \$3650. This was done in a high-cost year in the Chicago area, which is a relatively high-cost area.

If finances make the problem of owning your own home seem insurmountable, building this home yourself is the answer. Besides saving money, you will know that a good job of construction has been done, and you will be more conscious of the importance of proper maintenance to preserve the house throughout the years to come.

If you like to tinker or use simple tools—or even if you don't—there is no reason why you cannot put up this home because a concrete-block structure is the simplest type of construction. When you analyze such a structure, you will find that the building job should not be difficult. Pouring concrete footings to support the walls, which are laid up of concrete blocks, is easy. See the two details above. There is nothing difficult about laying the blocks as all you have to do is put mortar in the joints and use a



This view shows the house roofed with the windows in and ready for the interior work to be completed. While the original home was stuccoed outside, the walls could be left plain, or they could be painted with any good cement paint. Stuccoing, however, helps to waterproof the walls.



carpenter's level occasionally as a check to see that the walls are kept plumb as they are laid up. When the walls have been completed, the ceiling joists are installed and the simple hip roof erected and shingled. Here you will have to do a little carpentry but further on we show how this is done. Since the floors are reinforced concrete, which anybody can pour, the rest of the carpentry consists of putting in doors and windows and adding the trim. Doors and windows should offer no problem as installing them is just a matter of fitting the purchased frames into the openings left in the walls for this purpose, and then inserting the sash and hanging the doors. Sounds almost too easy, doesn't it? But remember that by saving the cost of labor you save approximately half the cost of the home.

You will have to put in many man-hours to complete the home, but maybe you have a friend or two who would be willing to lend a hand. In most cases, it will be necessary to hire the walls plastered as this work is beyond the ability of the average person. However, if desired, the plaster can be eliminated and wallboard substituted. There are many types of wallboard that can be worked into beautiful designs and installed easily by almost anyone. Wallboards are made in various thicknesses, and the soft-pressed types have fairly high insulating qualities. If you wish, plain-faced wallboard can be used and left in its natural finish for two or three years, after which the walls can be plastered, using the wallboard as a plaster base. Or, the plain wallboard can be sized and painted or wallpapered.

In some cities and towns, the building codes require that the electrical wiring and plumbing be done by a licensed workman. This also may be true of the sewer system. However, this work is not difficult and,



Bathroom is complete with modern built-in tub, lavatory and illuminated medicine cabinet. Appointments, such as soap dish, etc., are recessed into the walls

wherever the codes will permit, you can do it yourself. You can save time and money if you purchase a stock and dies of the sizes required so that the pipe can be cut and threaded right on the job. A small pipe vise will help, too. This equipment is relatively inexpensive. The heating plant also can be put in without any trouble. The one used in the original house was a gas-fired furnace of the forced-air type, but plants using other fuels could be used. However, if a warm-air furnace is installed, it will be necessary to use a blower as the warm air is delivered to the rooms through ceiling outlets, and returns to the furnace through tile ducts running under the concrete floor.

You will notice in the plumbing details that the bathroom is adjacent to the laundry tubs in the utility room. This makes it



Gas-fired hot-air heating plant, hot-water heater and laundry tubs are located in the compact utility room with plenty of space left for a washing machine

possible to use a minimum of pipe, even though it is necessary to make a fairly long run under the floor from the water meter to the kitchen sink. Since this pipe is underground and would be practically impossible to remove if a leak developed, lead pipe should be used here.

ROOMS

The interior photos on the preceding page and the three following this one will give you some idea of the compactness, yet cozy living space in this home. The bathroom features a 5-ft. built-in tub with recessed appointments such as soap dish, etc.,

modern lavatory and stool plus a mirrored medicine cabinet with attached lights. This, in addition to an asphalt or rubber-tiled floor, sums up to as modern a bathroom as anyone could desire. A shower, of course, could be installed easily at a slight additional cost. Don't overlook the possibility of installing a small, wall-type electric heater in the bathroom. A heater of this type is ideal when bathing on cool mornings and evenings when the outside temperature does not warrant starting the heating plant. If there is an infant in your home, the electric heater will be especially handy to warm the bathroom while bathing the baby.

Adjacent to the bathroom door is a handy linen closet of ample capacity. This can be provided with shelves as required. Or, if you prefer, the lower part could be utilized as a broom closet and the upper part for linens.

Between the bathroom and kitchen is the utility room in which are housed the heating plant, automatic water heater and laundry tubs. Also, the rear entrance door is off this room. Entrance to the attic by means of a disappearing stairway is provided in this room, too. Although the floor of the utility room in the original home was not covered, a good paint job or a moisture-resistant covering would improve the appearance enough to warrant the slight additional expense. Also, such a floor would be easier to clean.

A doorway in the right-hand wall of the utility room leads into the kitchen. Here you will find everything for modern home-making: beautiful sink and stove plus cabinets galore — everything to delight the modern bride. Cabinets are dropped from the ceiling and the base cabinets are linoleum-covered both for beauty and easy cleaning. There is plenty of room for a chrome breakfast set, and twin windows



above the sink add to the cheerfulness. Floor covering is a matter of choice, but either asphalt or rubber tile is recommended in the modern surroundings. Although it would mar the pleasing cabinet lines of the kitchen, the rear entrance door could open off the kitchen at the rear, left-hand corner. Cabinet space could be reduced to accommodate the door.

From the kitchen you enter the living room, which also serves as a dining area when the occasion demands. Two side windows and a gorgeous picture window in the front flood the room with light, yet the windows are so located that there is ample unbroken wall space for placement of furniture. The front entrance door is located near the left front corner of the room.

At the left rear corner is a simulated hall that leads to the two large bedrooms and the bathroom. Both bedrooms have two windows for cross ventilation, and both have spacious wardrobe-type closets.

Notice the large picture-type window in the spacious living room. Two side windows add to the cheerfulness

FLEXIBILITY OF FLOOR PLAN

Interior arrangement of the rooms can be changed somewhat, of course, but only to the extent that the main bearing wall will permit as this wall should remain in approximately its present position. Room sizes can be increased or decreased within the present square size to suit individual tastes. Also, it is possible to make a room or two upstairs. In this case, a gable roof would be necessary to provide headroom. If this were done, it would be necessary to reduce the size of some of the other rooms in order to provide space for a stairway. Also, it is possible to increase the over-all size of the house slightly to permit any desired changes. When this is done, the extra dimensions should be figured carefully so that the correct number of full-size concrete blocks can be used. This will be explained later on in this book.



Each bedroom has two windows for plenty of light and cross ventilation. There is room for a three-piece suite with space to spare. Large closets and rubber-tiled floors on which throw rugs can be used make the rooms attractive to both young and old.

WALLS AND PARTITIONS

Outside walls and the main bearing wall are laid up of 8-in. blocks, and the partition walls are of 4-in. blocks. The outside walls and the main bearing wall are supported on footings, but the partition walls rest on the concrete floor. There are several types of blocks that can be used. The original home was constructed of lightweight blocks, which have the same appearance as regular concrete blocks but are made of light aggregate and, therefore, are considerably lighter in weight. Also, such blocks have better insulating qualities than the usual type of concrete block. There also are several commercial types of imitation stone-effect blocks that could be used.

When regular concrete blocks or lightweight blocks are used, the outside surfaces of the walls are stuccoed. This helps to waterproof the walls and gives them a smooth appearance, unmarred by joints. However, the stucco finish is not absolutely

necessary. The bare block walls could be finished with regular cement paint if desired.

INTERIOR WALL SURFACES

The outside walls are furred out and plastered over a plasterboard or other suitable base. This is done to provide a dead-air space, which acts as insulation. Partition walls are plastered right over the blocks as it is unnecessary to provide insulation on these walls.

WINDOWS AND DOORS

Windows used in the original house were of the steel-sash type, although any other type desired could be used. Doors are a matter of choice. The flush-type interior doors are especially appropriate for this modern home.

FLOORS

These are reinforced concrete poured over a coarse-gravel fill. Wall-to-wall carpeting can be used over them, or you can

What woman could resist this kitchen with cabinets galore, both wall and base, as well as a modern sink with plenty of room for that new stove and refrigerator and a new breakfast set, too? Twin windows above the sink provide plenty of illumination, and a rubber-tiled floor makes the cleaning job an easy one



carpet the living room and use tile or linoleum in the rest of the rooms. Very beautiful floors can be produced in this way.

INSULATION

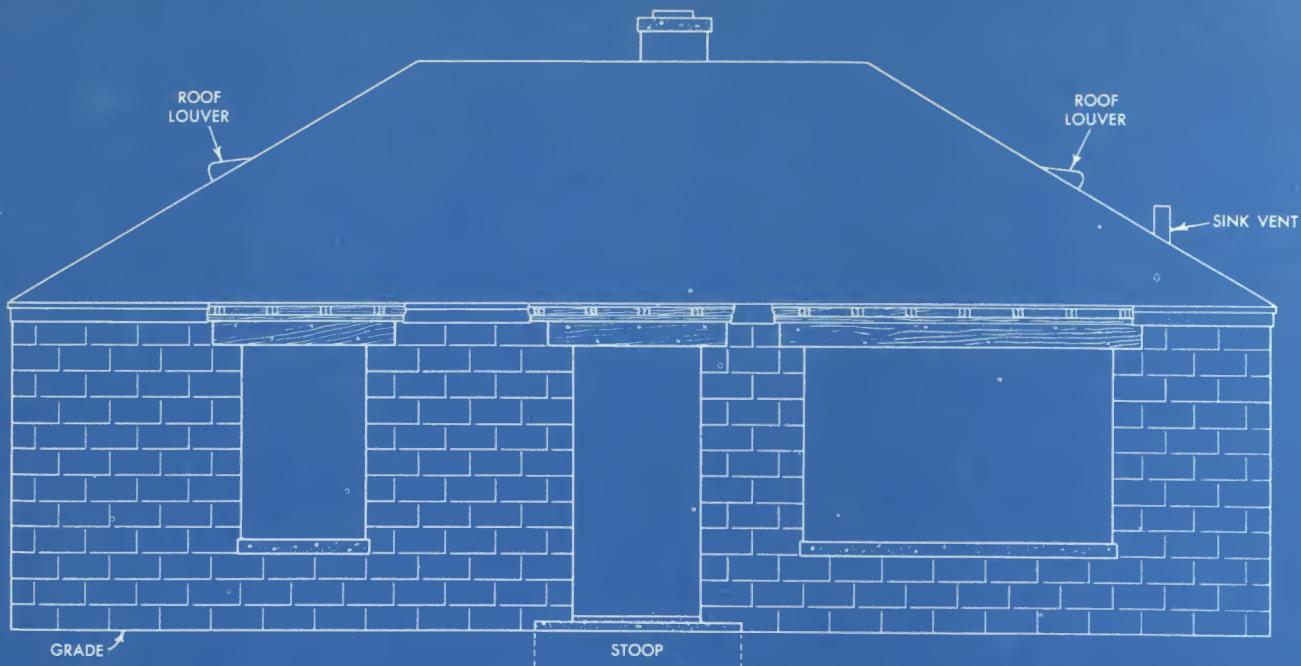
As stated before, the outside walls are furred out and plastered to provide insulation. Ceilings are covered with 4 in. of poured insulation. Any other type that is suitable could be used just as well. To prevent cold from penetrating the walls and passing into the floors at the outside walls, thick, rigid insulation is placed between the walls and edges of the floor and extends back into the floor 2 ft.

In addition to the insulation, the house is damp-proofed by a vapor seal, which is placed under the floors and up the outside walls to the attic. This is a moistureproof paper that prevents dampness from creeping through the floors and outside walls. You will find that this eliminates practically all dampness.

BASEMENT

If desired, you can put a basement under the house for the heating plant and laundry, and thus convert the utility room to another bedroom or a small dining room. If you used it as a dining room, the present door between the kitchen and living room could be moved over to form an arched doorway between the living room and dining room. The present door between the kitchen and utility room could remain. Another suggestion would be to move the left kitchen wall over toward the bathroom, leaving just enough space to build stairways to the attic and basement. There would then be space in the enlarged kitchen for a built-in dining nook. Many other room arrangements will come to mind if you study the cutaway view in the four-color section at the front of the book.

Although there are no plans available for adding a basement, this work should not be too difficult for the average man. It is just

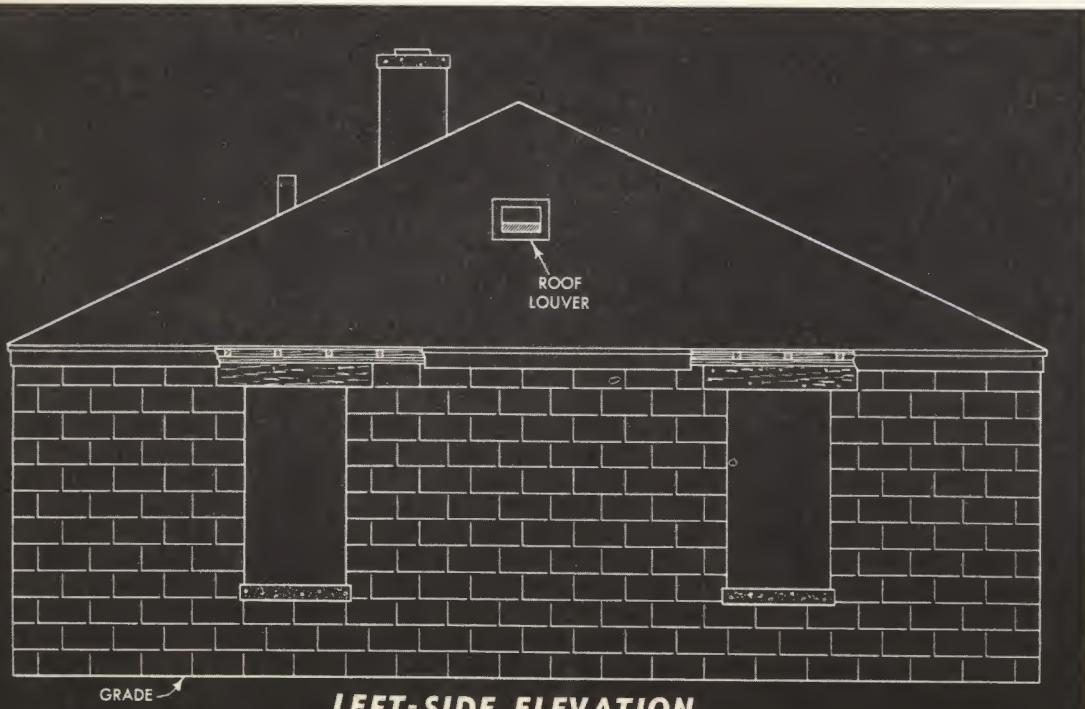


FRONT ELEVATION

a matter of excavating to the correct depth and running the foundation walls higher. The floors should be changed to wood as building cement floors above a basement is, in most cases, beyond the ability of the average inexperienced builder. Ends of the floor joists would be set into the foundation walls and supported at the location of the present main bearing wall by a heavy timber and posts in the conventional manner. All par-

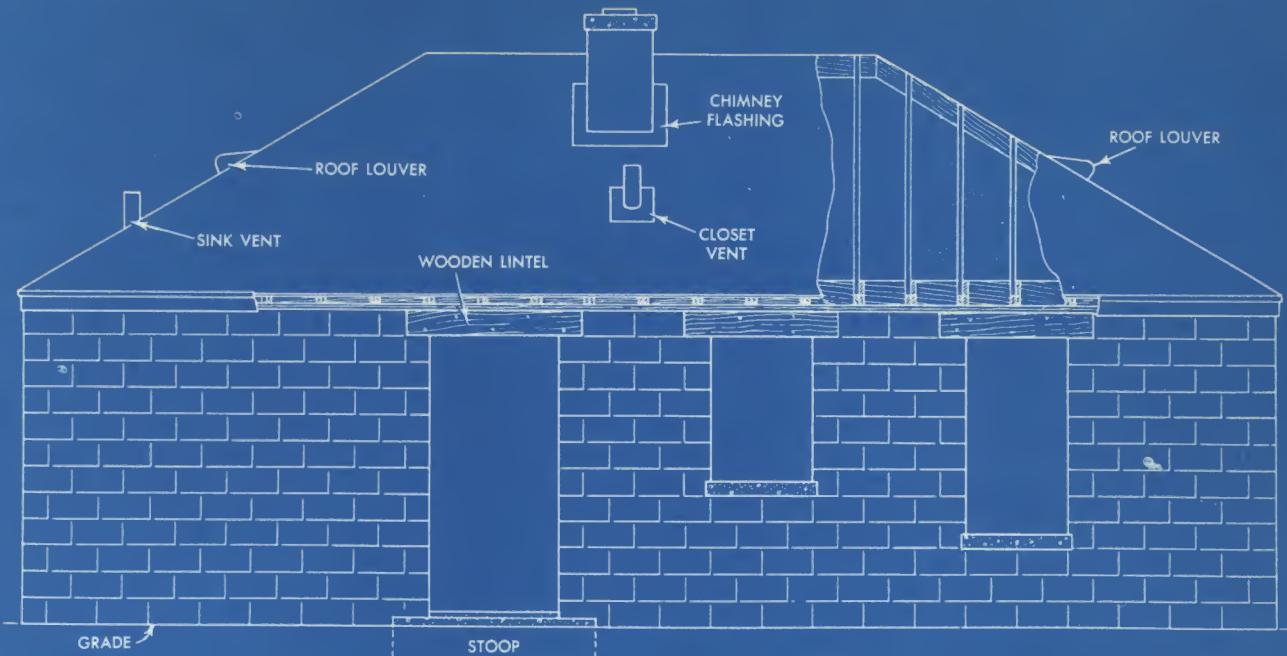
tion walls would have to be changed to regular stud type as the wooden floors would sag under the weight of concrete-block partition walls.

If a basement is put under the house, it is very important that drain tile be placed around the footings, especially if the basement is dug in soils that tend to hold water, such as various types of clay. The tile will drain off water that collects around the foot-



LEFT-SIDE ELEVATION

From the elevations on this and the adjoining page you can get the exact number of full and half blocks needed for each exterior wall, as every block is indicated. Positions of roof louvers, closet and sink vents, etc., are also shown. Elevations show the number of rows of blocks above grade and window and door openings, also stoops

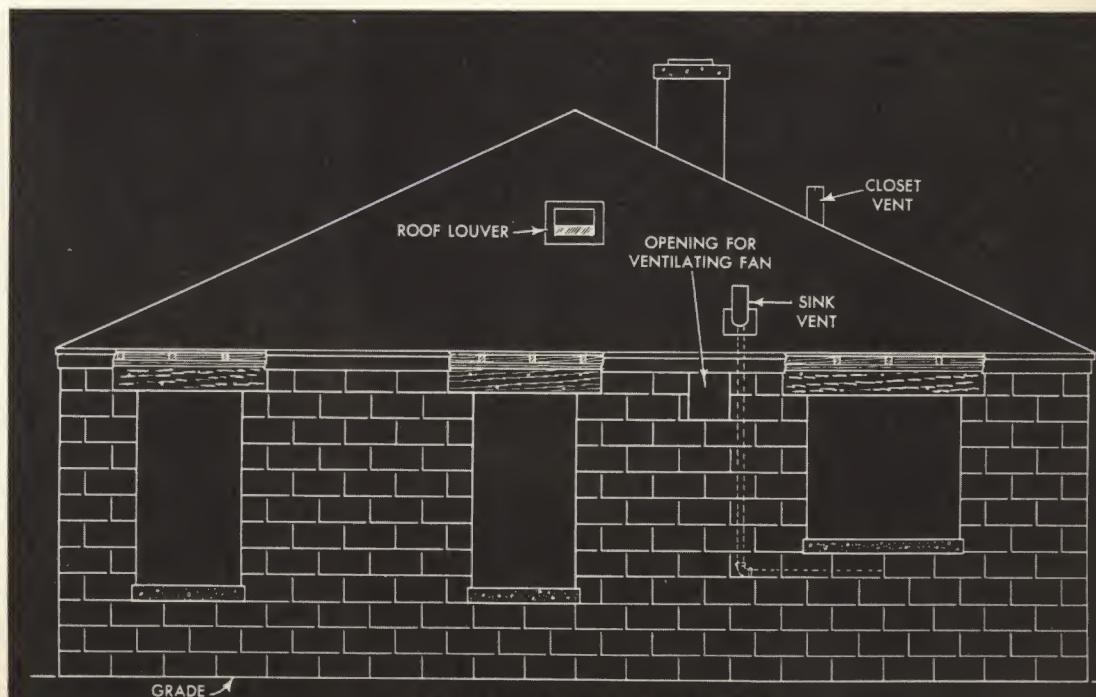


REAR ELEVATION

ings and thus prevent it from seeping up around the basement floor. Also, the tile will be instrumental in keeping the basement walls dry. It is always a good idea to coat the outside surfaces of the walls with hot tar as a further protection against dampness. The floor should be concrete, not less than 5 in. thick, poured over a compacted, coarse-gravel fill not less than 4 in. thick. Something that many people overlook when

building a new home is the possibility of coloring the basement floor when it is poured. This will solve many problems later if you should decide to put in a recreation room. The coloring will last the lifetime of the floor, and will avoid all the problems that usually come up if a concrete floor is painted. Practically all material dealers have the coloring material, which is mixed either with the finishing coat or is troweled into it.

Window and door openings are located by counting the number of full and half blocks from each corner. Plain-end blocks are used at building corners, also at window and door openings. All openings use stock sash and doors. Frames are cut, assembled from 2-in. stock. Window, door sills are cast in place



RIGHT-SIDE ELEVATION



Clean lines and a stucco finish outside make this a home that you can be proud of in any surroundings

Above is a view of the house completed, landscaped and ready to move into. It will provide you with a comfortable place to live for a lifetime, and will last even longer if it is correctly maintained.

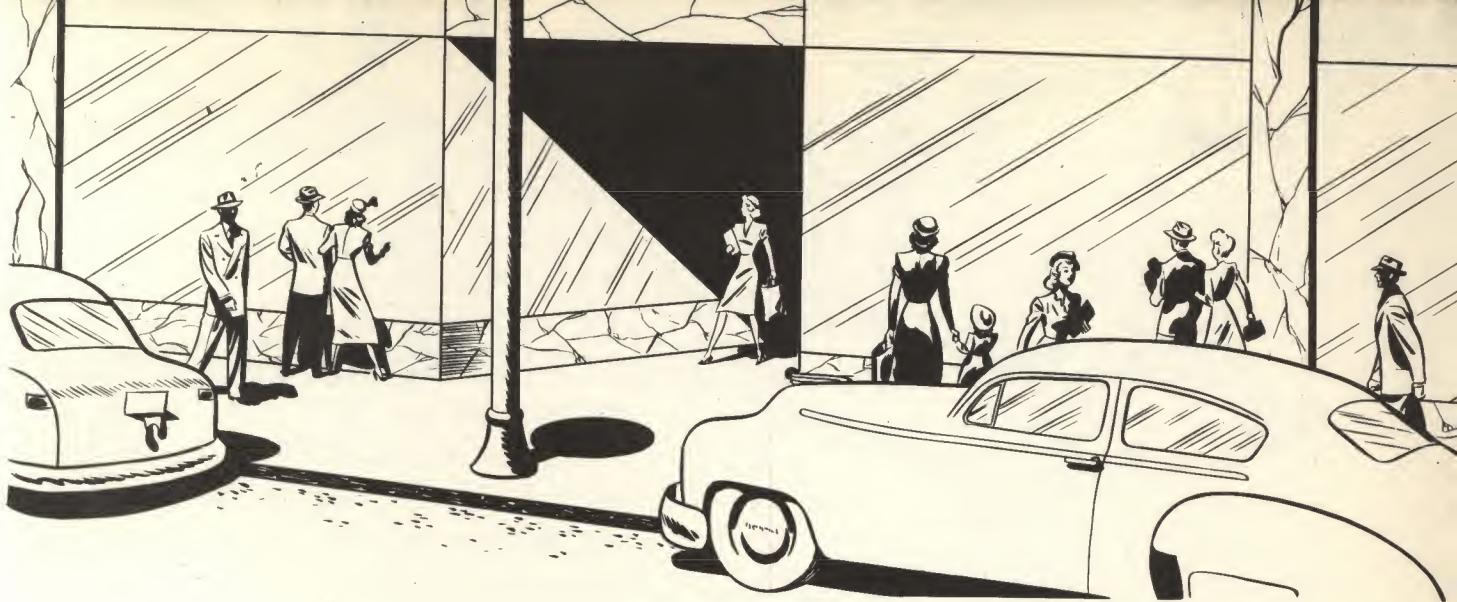
However, don't let your enthusiasm to



get started building the house cloud your thinking on other factors that are vital in building a home. Owning a home is a large investment for most people. So don't act hastily in selecting the homesite. Take time to investigate the many factors that should be considered, because once the house is built it is not easy to move if you dislike the location. The sketches on this and the three following pages tell the story.

SCHOOLS

First, and probably foremost, in the factors to be considered is schools. Good schools have more bearing than anything else on the value of a home, both for yourself and for resale. Be sure the schools are good, and if the community is new, be sure they are adequate for the possible increase in population. If not, what are the plans for increasing them? Keep in mind that new schools or additions cost taxpayers money.



SHOPPING CENTER

Next in importance to the average homeowner are shopping facilities. No housewife likes to travel long distances to do her everyday shopping, especially if she does not drive the family car. If there is a shopping center nearby, is it adequate for your needs? If there is no shopping center, what are the plans of the community for stores in the near future, and are the plans likely to materialize? Also, how far is it to a good shopping spot where you can purchase everything you will need? If you do not have a car, or if the car is not available to your family during your working hours, is there transportation available for members of the family to get to stores?

CHURCHES

Practically all communities have churches, of course, but is there one of your denomination? If not, how far is it to one you might wish to attend? Don't overlook the people who attend the church with which you may wish to become associated. As a whole, are they the type that you can make your friends? Are the youth activities the kind in which you would wish your children to participate?

The same is true of the community. If it is only partially built up, what kind of

homes are likely to be built later? The value of a small house surrounded by homes that cost several thousands of dollars more than it, decreases almost as much as if it were surrounded by homes costing several thousand dollars less. Neighbors are important, too. If they are friendly, civic-minded, and keep their homes and lawns well-maintained, you have nothing to fear. Few things add so much value to a home as having it on a street or in a locality where the owners take pride in keeping up the appearance of their own homes as well as the community in general. These factors may not seem too important on the surface, but they will become important after you build and move into your home. After you have decided on the community for your home, try to get to





know the families who will be your neighbors. Find out what they dislike about the community. This also is a good way to form an opinion of the schools, shopping centers and churches.

TRANSPORTATION

Don't overlook public transportation in the community where you plan to build.



Will it fill your needs? If the community is growing, what are the future plans of the transportation company to take care of the expected increase in the population?

TAXES

Real-estate taxes are another important item. It will be a good idea to check with the proper authorities to learn approximately what the taxes will be on the property when the house is completed. Keep in mind any future improvements of the community that might increase them. New schools or

school additions, new parks or community buildings are several things that might cause taxes to be increased. Also, check into the ordinances as well as the



zoning laws of the town before you purchase a lot on which to build your home. There may be something to prevent you from building the house as you want it. Or, there may be no zoning laws to protect you against undesirable construction. If there are not, you may wake up some morning to find a business building or manufacturing plant going up next to or close to your home. If you don't want your home filled with soot and smoke, it will be advisable to check on railroads and manufacturing plants already installed. Are there any close enough to bother? Are there zoning laws to prevent them from being built close enough to bother you?

Next, look into the fire and police protection in the community. Is the locality policed carefully and could a fire truck get to your home quickly, if needed? Good fire protection reduces fire-insurance rates. If there are no public fire-protection facilities, investigate the possibility of engaging the services of the fire department of a nearby village or town. Such services often are available for a nominal yearly fee in localities having no fire protection.

STREETS AND ALLEYS

While you are investigating, check up on the streets and alleys. If the streets are not paved, or if they are badly in need of repair, you are likely to be assessed for them later, especially if the community is growing rapidly. Keep in mind that you likely will want a garage at the alley. Will it be passable during wet weather or will you have to plow through mud to get your car out? If the alley is unsurfaced, will it be possible to have it surfaced with cinders, crushed stone or other suitable material? What will it cost, and will other homeowners using the alley share the cost?



WATER AND SEWERS

There is nothing quite so discouraging as sewers that flood every time it rains hard. Since this house has no basement, you will not be bothered with flooding, but property values are likely to be low from a resale angle in a community where the basements flood. Not only that, but it may become necessary to enlarge the system and you will be assessed heavily for this improvement. Also keep in mind that bad or inadequate sewers are a health hazard not only to you but to everyone served by them. Local residents can inform you about the sewer system. If their basements have never flooded and the community is growing or there is vacant space for it to grow, call on the village clerk and find out if the sizes of the sewer tile are large enough to take care of the increase in homes. If they are not, then you had better forget about the location or else be prepared to take care of a heavy assessment on your property.

Next, look into the water situation. Is it sufficient and is pressure maintained at all times? Protection of a fire truck is useless if water pressure is inadequate in the mains. Also, find out if the present mains are large enough to handle a number of new homes, if there is a possibility of new construction.

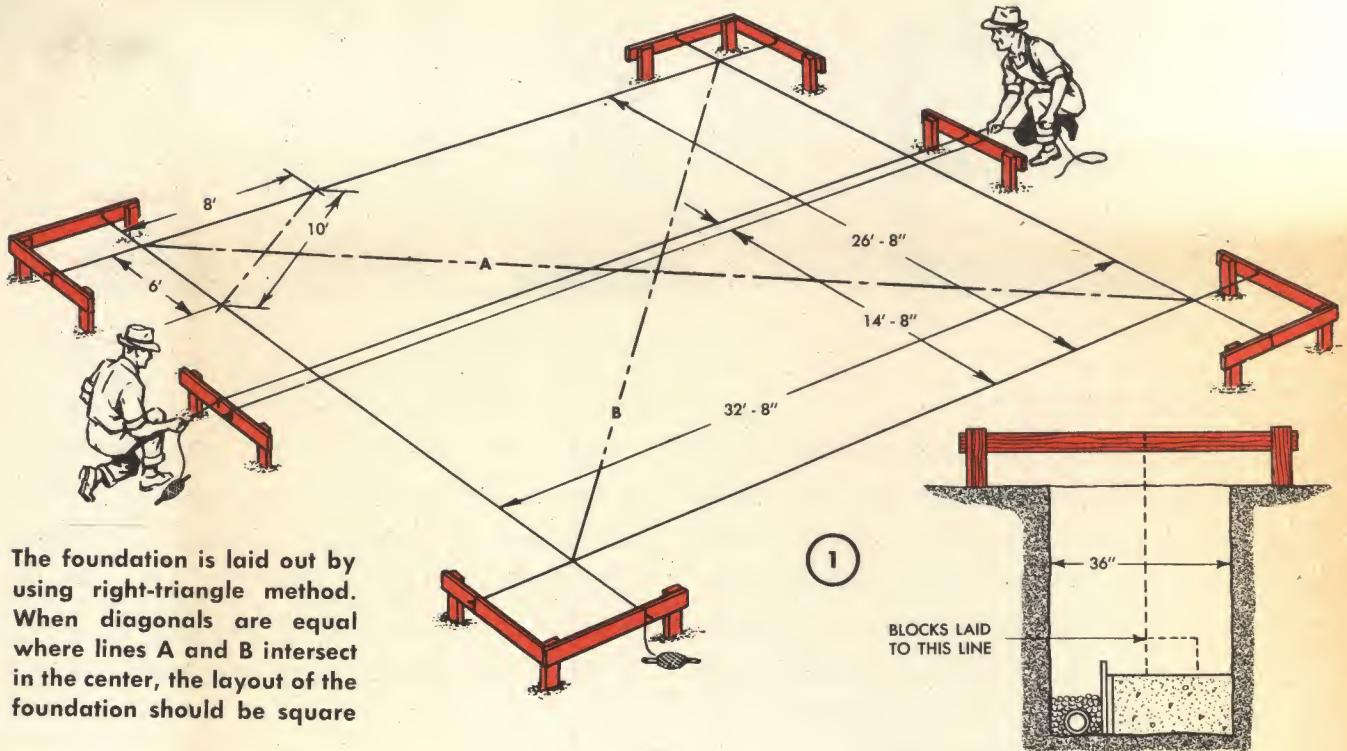
THE LOT

Last, but not least, is the lot. The position of the house on the lot, the exposure you desire and the size you wish will be the gov-

erning factors in purchasing it. If possible, the lot should be high for good drainage. If it is located in a low place or at the bottom of a slope, you may be bothered by seepage. Or, during heavy rains, the lot may be flooded. Also, the kind of bearing soil under it is a governing factor as well as the surface soil. If this has a high clay content, it will be difficult to establish a lawn, or keep one growing after it has been started. It will take a few years to mix enough humus with such soil to make it productive, and hauling black loam to cover a lot to a depth sufficient to grow a good lawn is very expensive, especially if you are located where such soil must be transported many miles.

After you have located the community in which you would like to build and found everything satisfactory, you are ready to purchase the lot and start constructing this beautiful home.





BUILDING LAYOUT

The first thing to do is have the property surveyed accurately to establish the boundaries of the lot. Then, establish permanent markers at the four corners of the lot, such as iron stakes driven below the surface of the ground.

Next, establish the four corners of the foundation. You can do this by the right-triangle method shown in Fig. 1. This method is based on the fact that a triangle 6, 8

and 10 ft. long is a right-angle triangle. Use the lot boundary markers, or a sidewalk at the front of the lot, as a base line in locating the house squarely on the lot. Measure in from the base line an equal distance and drive the two front corner posts or stakes. These are not shown in Fig. 1, but they should be located where the lines intersect in front of each group of batter boards. Space the stakes 32 ft. 8 in. center-to-center. Next, locate the rear stakes exactly 26

ft. 8 in. behind the front stakes, spacing them equal to those at the front. Drive all four stakes down so their tips are at the same height as desired for the top of the foundation wall, or grade level, of the finished house. Then drive nails exactly in the centers of the stakes at the top to project about $\frac{1}{2}$ in. Stretch a chalk line around the nails to establish the 6, 8 and 10-ft. measurements, as shown in



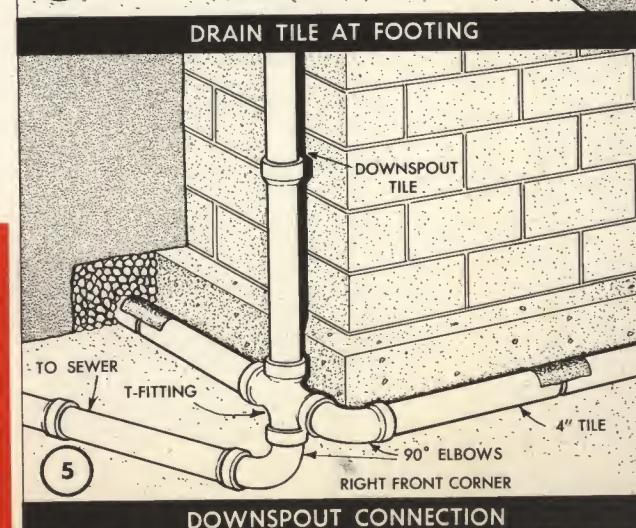
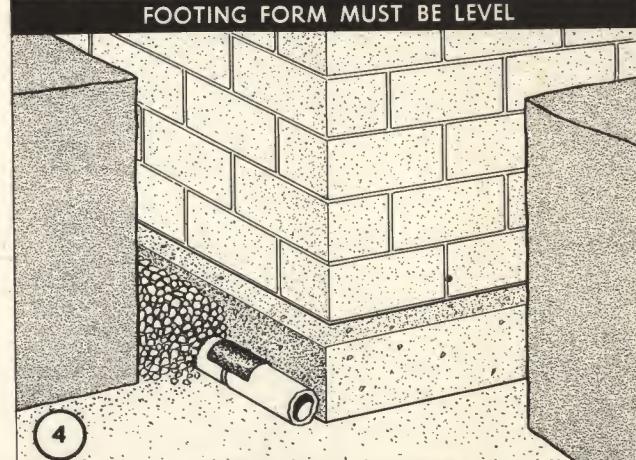
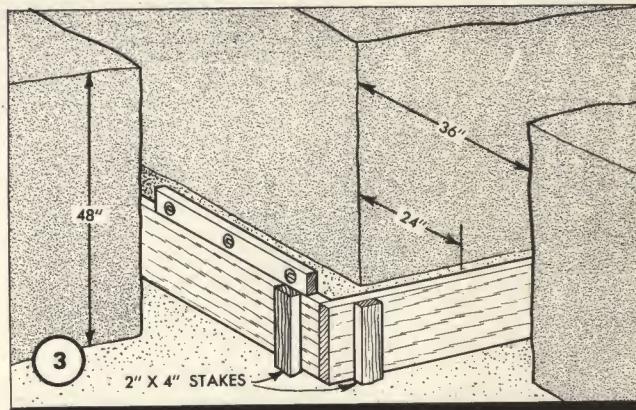
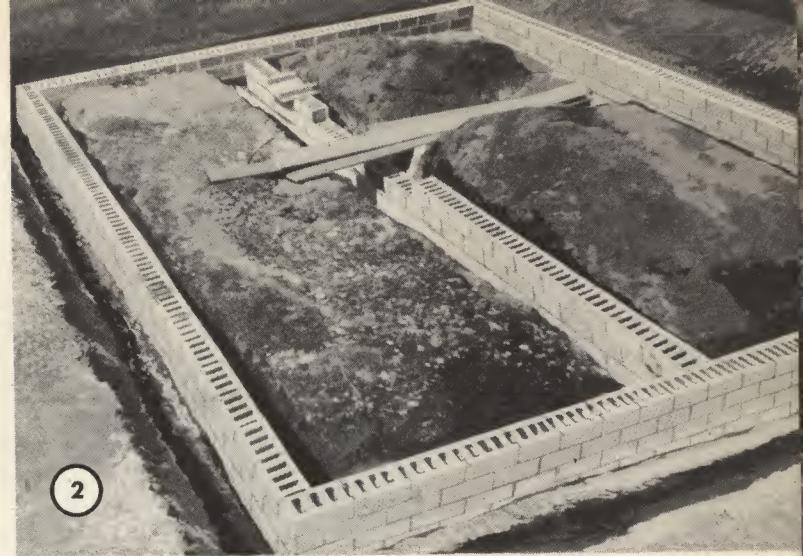
Fig. 1. It may be necessary to relocate the rear stakes to establish the measurements correctly. As a double check, stretch strings A and B diagonally between the posts. When the diagonals are equal where the strings intersect or the strings are of equal length, the layout is square.

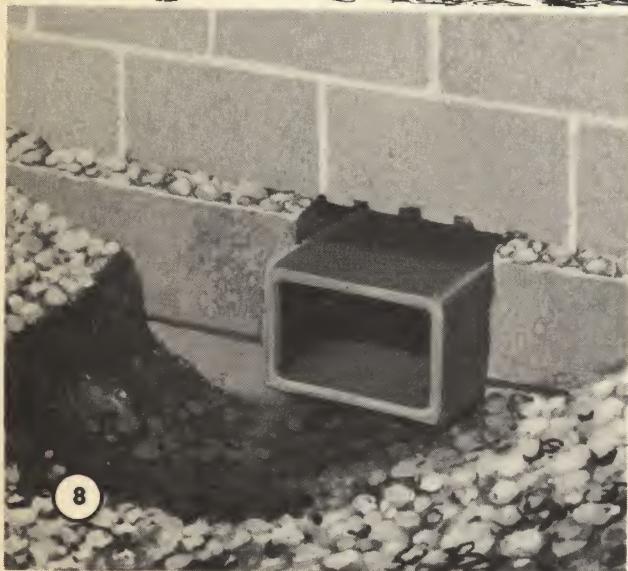
Next, set up batter boards behind the stakes and also for the main bearing-wall foundation. The boards are the same height as the stakes, and shallow notches are cut in them directly in line with the nails in the stakes. The boards and the notches provide permanent reference points if the stakes are destroyed while digging the trenches for the foundation footings.

FOUNDATION EXCAVATION

Now you are ready to start the actual work. The foundation trenches can be dug by hand, but a power shovel will do it easier. Make them at least 36 in. wide so that you will have room to work, and about 52 in. deep, as measured from the top of the batter boards. The footings must be below the frost line. In some areas it may be necessary to go deeper, while in others the trenches can be shallower. Dig trenches for the four outside walls and the main bearing wall. The trench for the latter will not have to be as deep, about 37 in., as the one for the outside walls.

Before starting the trenches, refer to the detail in Fig. 1. Notice that a plumb line dropped in from the batter board chalk line





When laying up the main-bearing-wall foundation, install a cold-air-return tile in the last course of blocks, then start courses of small blocks as illustrated below



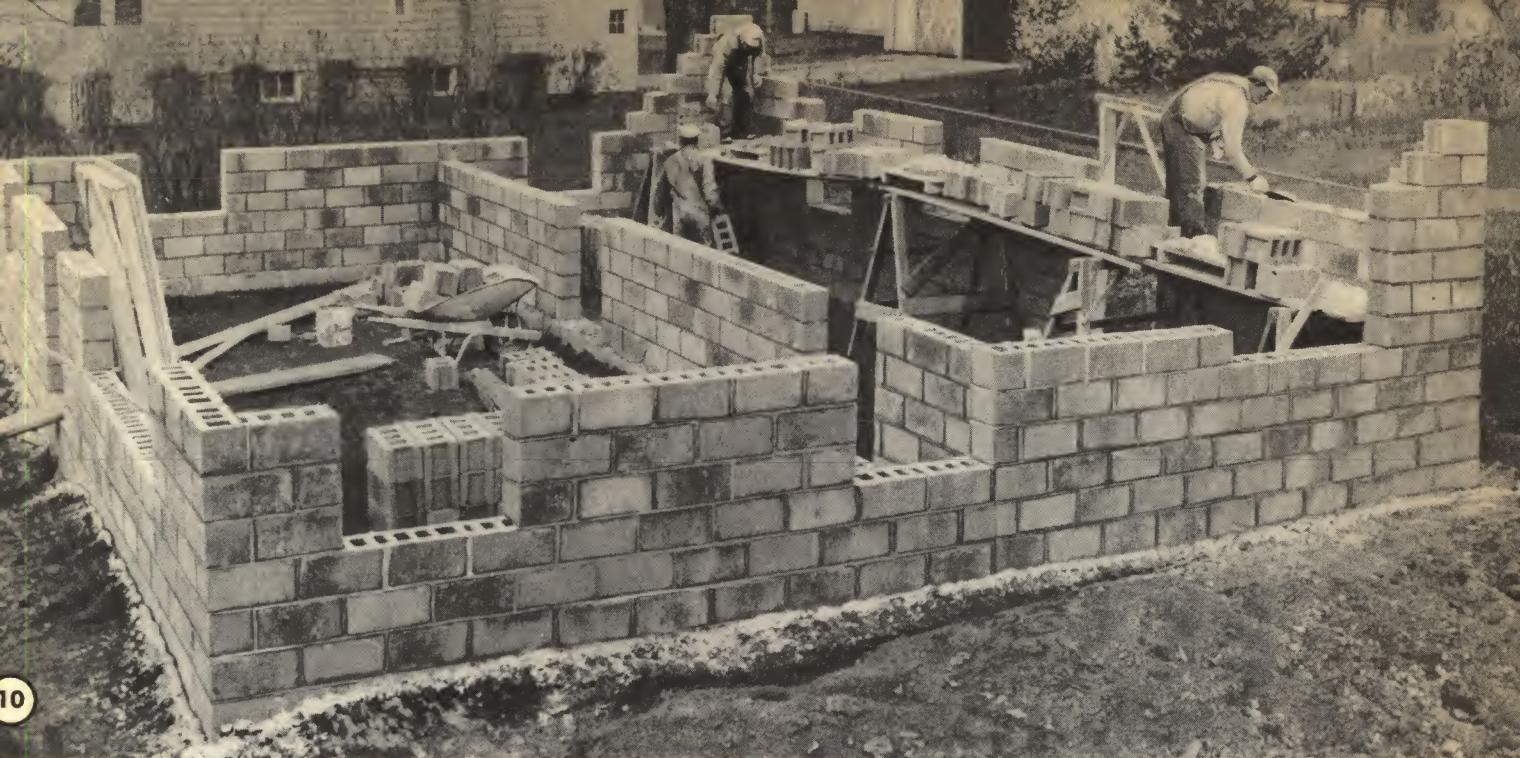
establishes the outer surface of the foundation wall. So, dig the trenches accordingly to position the footings correctly. The bottoms of the trenches must be level and the same depth on all sides in relation to the height of the batter boards. This means that the trenches may be deeper on one side or end if the ground slopes. Leveling the trenches is necessary in getting the footings level all around. If footings are not level, walls will not be level.

FOOTINGS

After the trenches have been completed, you are ready to put in the footing forms. Fig. 3 shows how to do this. Footings are 24 in. wide by 12 in. thick which is large enough in most soils. Since the inner sides of the trenches serve as one side of the footing forms, you will need forms only on one side. These are 2 x 12-in. planks, set on edge 24 in. from the inner trench wall, and staked in position. Use a carpenter's level to get the forms level all around. Provide forms for the footing under the main bearing wall in the same way.

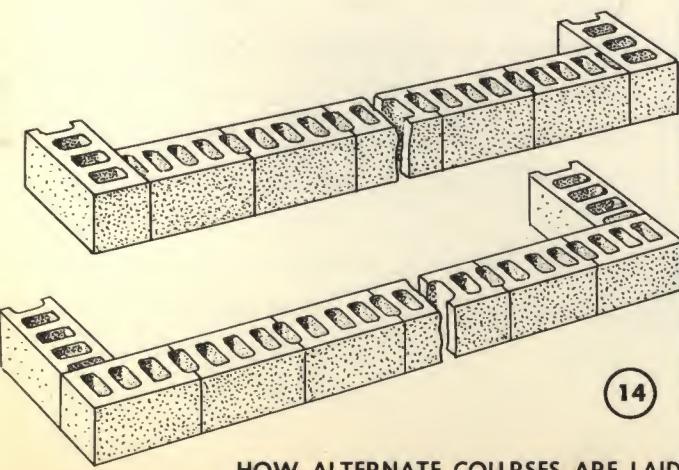
When the forms are in position you are ready to pour the footings. Fig. 6 gives the proportions of cement, sand and stone for the mix. The concrete can be mixed by hand, but a small mixer will save a lot of labor. Avoid making the mix too thin—just so it will puddle nicely in the forms is about right. Strike off the concrete flush with the form boards.

It will be necessary to let the footings set for a day or two before laying the foundation blocks. During this time, keep the concrete wet. Old burlap bags placed over it and sprinkled occasionally will do the trick. However, as soon as the concrete has set enough to hold its shape, you can re-

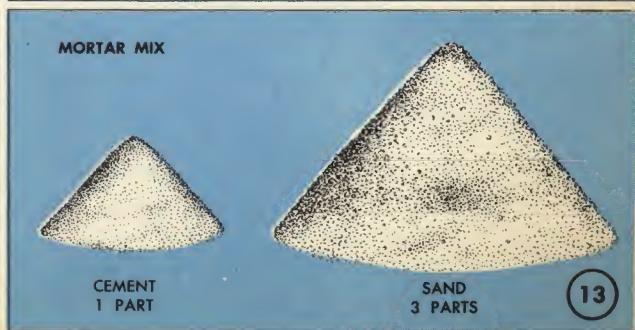
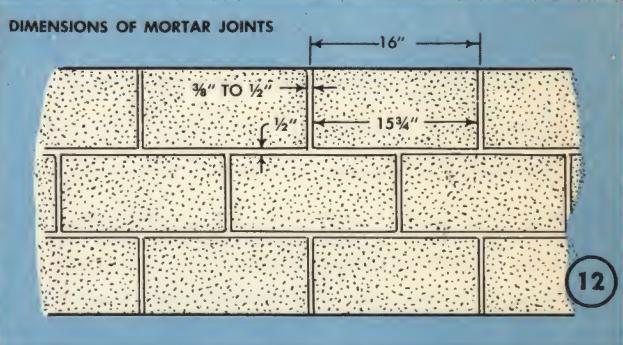
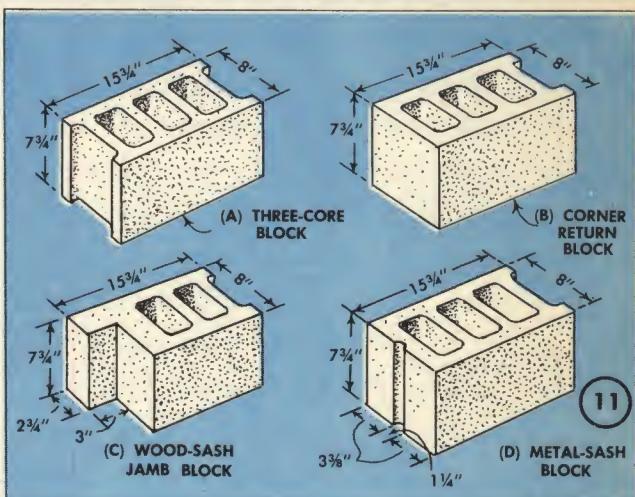


10

move the forms and lay drain tile around the footings, as indicated in Fig. 4. While the tile is not absolutely necessary, it will help keep the ground under the floor dry and thus reduce any tendency of the floors toward being damp, especially where the house is set on low ground or at the foot of a slope. Lay the tile with the joints open $\frac{1}{8}$ to $\frac{1}{4}$ in. and cover the top half of each joint with a strip of tar paper or asphalt roofing to keep out dirt and gravel. Connect the drain tile to the downspout tile as indicated in Fig. 5. This illustration is suggestive



HOW ALTERNATE COURSES ARE LAID



only, as the method of connecting the tile to the sewer system will depend on the direction from which the main sewer comes into the house.

SEWER SYSTEM

Just when to put in the underground part of the sewer system is a matter of choice. Probably after the trenches are dug and before pouring the footings would be the best time. However, it can be done any time before the floors are poured. Refer to the sewer description further on in this book.

LAYING THE FOUNDATION BLOCKS

Next comes laying the foundation walls. Use five courses of 10-in. blocks for the outside walls and three courses of 12-in. blocks for the main-bearing-partition wall. Although standard concrete blocks come in various widths, their lengths and heights are the same. Special blocks, however, may vary even in height. We are using only standard blocks in this house. The three-core block shown in detail A of Fig. 11 is used in the foundation. Proportions of aggregate for the mortar are shown in Fig. 13. Cement in this illustration refers to mason's cement, which contains portland cement and lime. If you do not use mason's cement, mix portland cement, 1 part, hydrated lime, 1 part, and sharp sand, 6 parts. Mix the aggregate thoroughly. You will have to experiment to get the correct consistency for easy working.

Before actually laying the blocks, place the first course in position along the footing and around the corners. This will enable you to get the wall started at exactly the right dimension. Fig. 12 gives the correct joint widths. These dimensions can be varied somewhat to correct any slight discrepancy in the wall level or spacing of the blocks.

When the blocks are in the correct position remove a couple of them at one corner and apply two ribbons of mortar on the footing. Then apply mortar to one end of the first block and set it in place. Figs. 15 and 16 illustrate this procedure. Continue until the course is laid. Check the course horizontally with a long mason's level. If the course is off slightly, you can correct it by increasing or decreasing the width of the joints between courses as the wall is laid up. After the first course, keep the corners built up higher than the rest of the wall. Fig. 14 shows how alternate courses are arranged. After the first course has been completed and the corners laid up three or four courses high, stretch a chalk line between the corners at the top of each course before it is laid to serve as a height and outside limit guide for the next course. Do this for each course. The line can be seen in use in the photos, Figs. 17 and 19. Check the corners vertically with a level as you lay them. Also check each course horizontally as in Fig. 7. When the foundation has been completed, it will appear as in Fig. 2.

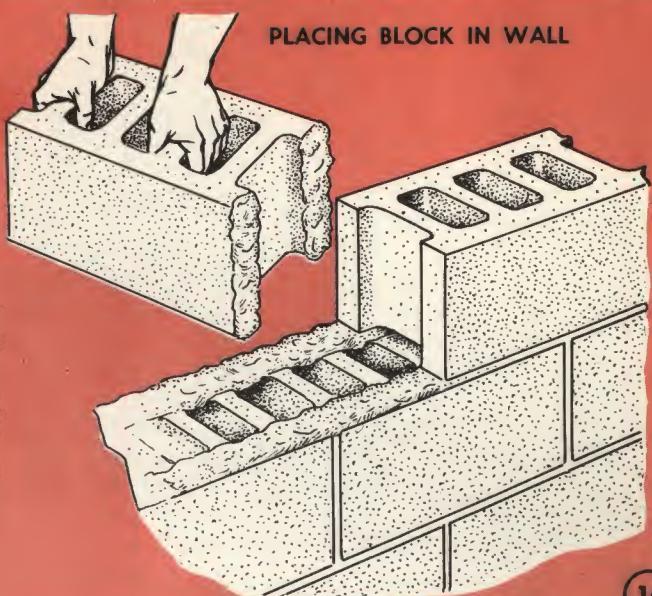
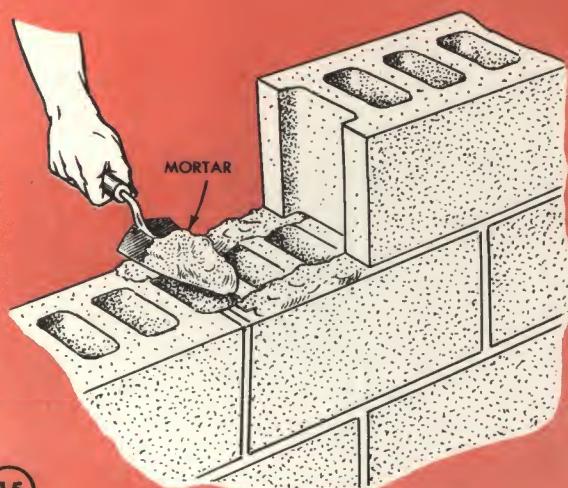
OUTSIDE WALLS

Before starting the outside walls, the door and window frames should be on hand to set in place as guides for getting the correct openings as the walls are laid up. You can refer to the wall elevations in the front of this book and count the blocks from the corners to the various openings to get their locations, also their sizes, but as a check it is a good idea to have the frames, too, because in most cases it is better to set the frames and then build the walls around them. Refer to the section "Installing Doors and Windows." The frames can be braced to keep them in position.

The outside walls are laid up in the same

APPLYING MORTAR TO BLOCKS

PLACING BLOCK IN WALL



Apply ribbons of mortar about $\frac{1}{2}$ in. thick near the outer edges of the course of blocks already laid—

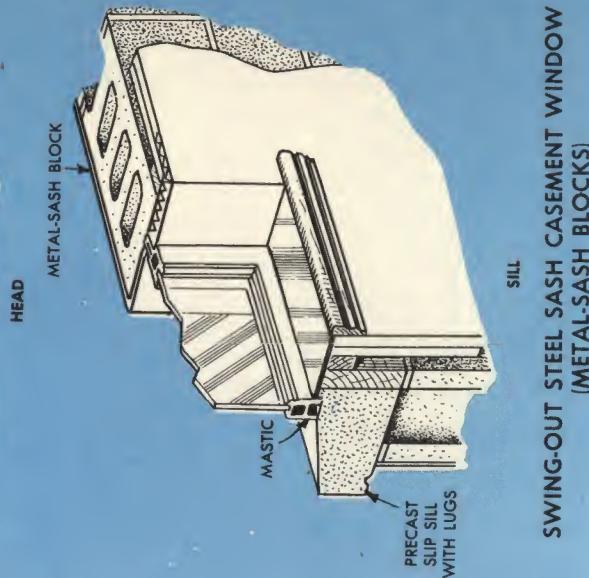
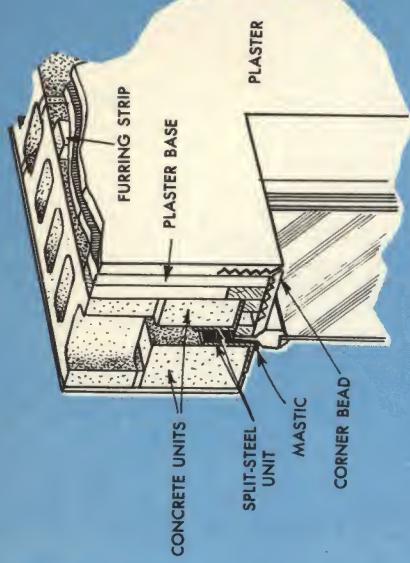
then apply mortar to the abutting end of the block and seat it firmly in the mortar bed by tapping it

way as the foundation except that 8-in. blocks are used. Fig. 9 shows how the smaller blocks are placed on the large foundation blocks of the main bearing wall. On the outside walls, the 8-in. blocks are laid flush with the outer surfaces of the foundation blocks. When laying up the main bearing wall, refer to the cold-air returns elsewhere in the book and then notice in Fig. 8 how a cold-air-return tile must be installed in the wall as the blocks are laid up.

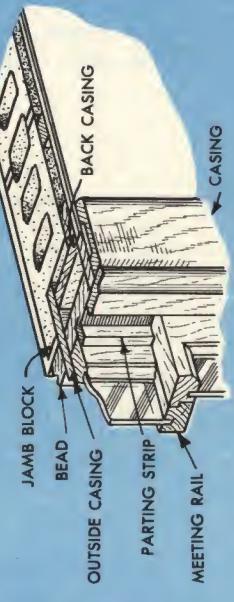
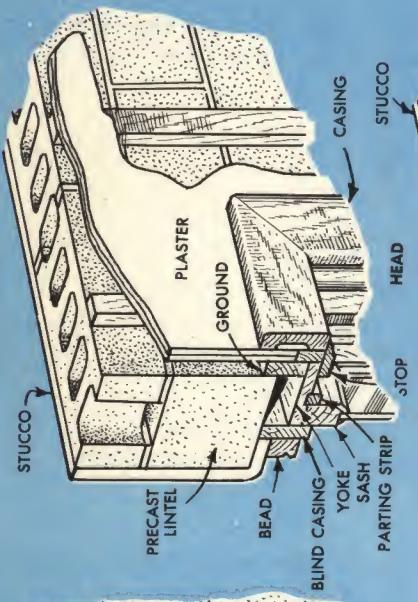
A study of the details in Fig. 11 will show the kinds of blocks used in the walls. As the name implies, corner return blocks, detail B, are used at the corners and at the door openings. The regular three-core block, detail A, is used for the rest of the wall except at the window openings where either wood-sash jamb blocks, corner return blocks

Notice below how half blocks are required in alternate courses around the window and the door openings



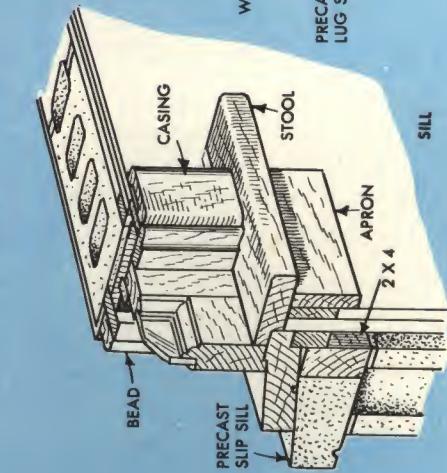
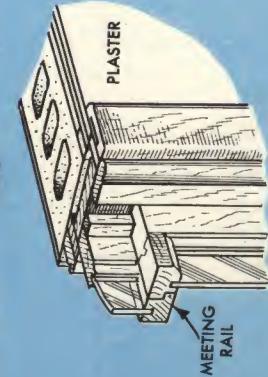
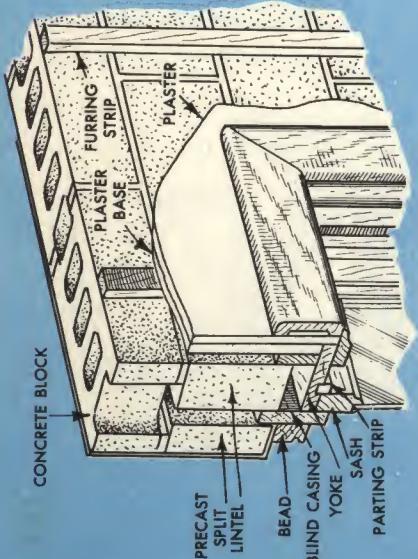
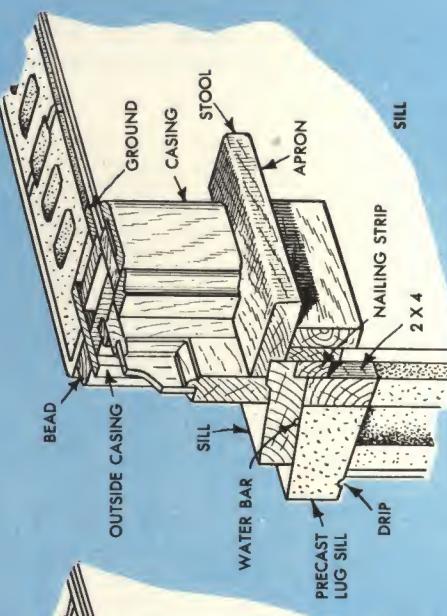


SWING-OUT STEEL SASH CASEMENT WINDOW
(METAL-SASH BLOCKS)



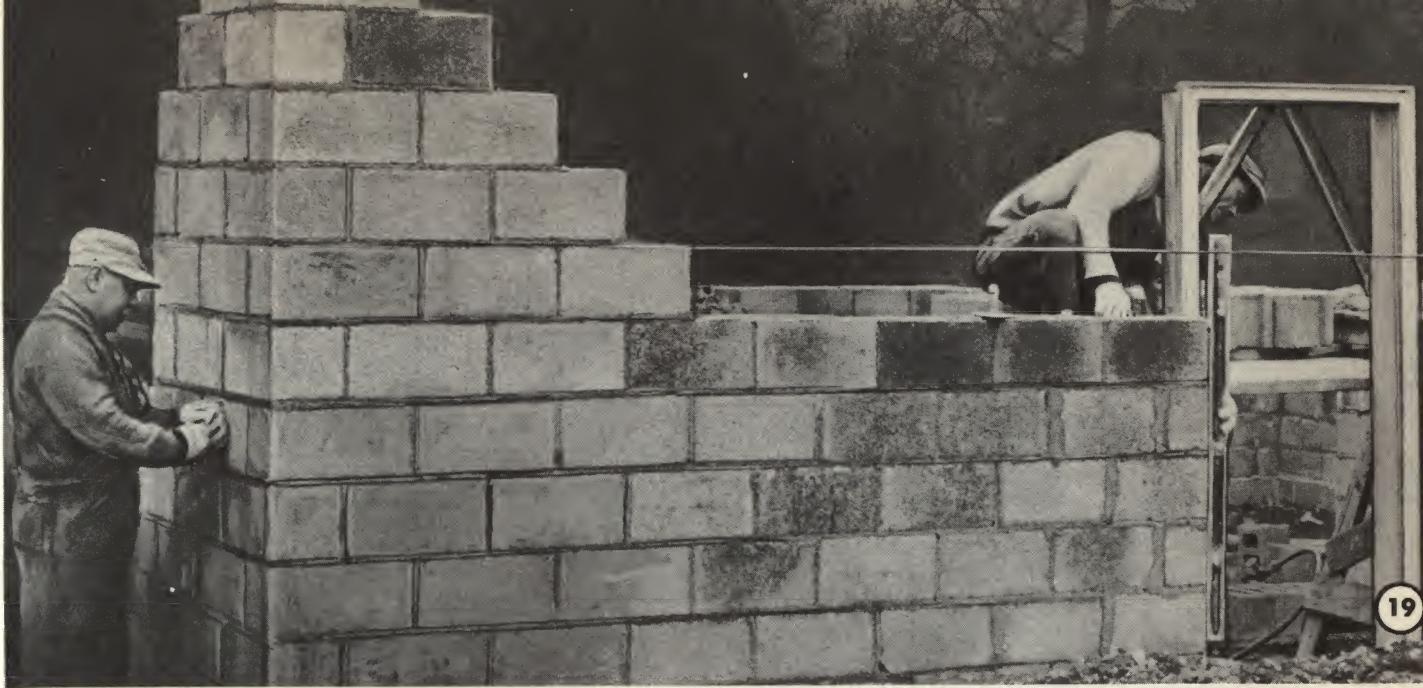
18

JAMB



TYPICAL WOOD-SASH WINDOW INSTALLATION
(CORNER BLOCKS)

Illustrations Courtesy Portland Cement Association
International Technical Society
Publishers of "Cement Simplified,"
Volume 1, by J. R. Dassel



19

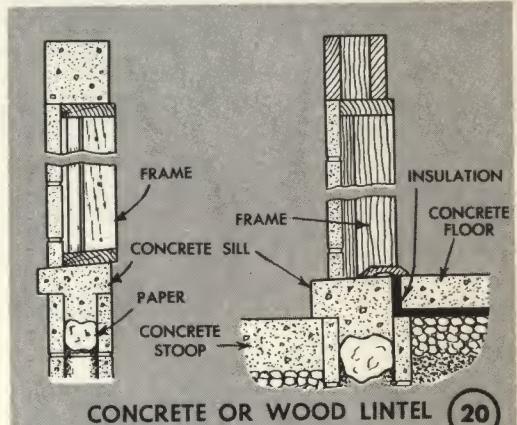
Corners are kept higher than rest of wall so chalk-line guide can be used. Plumb wall openings at frequent intervals with level

or the metal-sash blocks are used, depending on the type of windows you intend to use. A study of the details in Fig. 18 should give you an idea of how the windows are installed. If your particular windows differ from those shown, you should be able to adapt this information to the type you have. If metal windows are used, they can be put in any time.

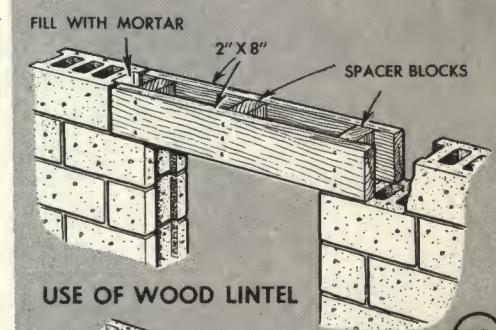
Figs. 10, 17 and 19 show views of the walls at different phases of construction. The door frame is braced in place as the wall is built up around it, Fig. 17. Window frames are handled similarly.

SILLS AND LINTELS

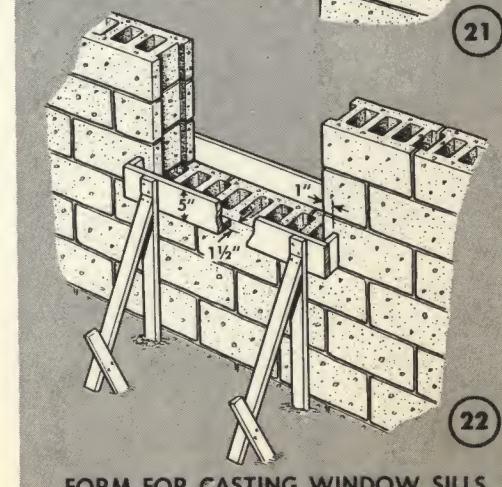
Door and window sills are concrete and are cast in place to become an integral part of the wall. Fig. 20 shows a cross section through a doorway. Forms are made up for the sill and stoop. Notice that the sill overlaps the stoop. Paper is wadded into the block openings to prevent the concrete from running through them. Push the paper down several inches into the openings so that the sill will be anchored firmly. The window sills are handled in a similar manner. The left-hand detail of Fig. 20 shows a section through a window and Fig. 22 shows how the forms are installed.



CONCRETE OR WOOD LINTEL 20

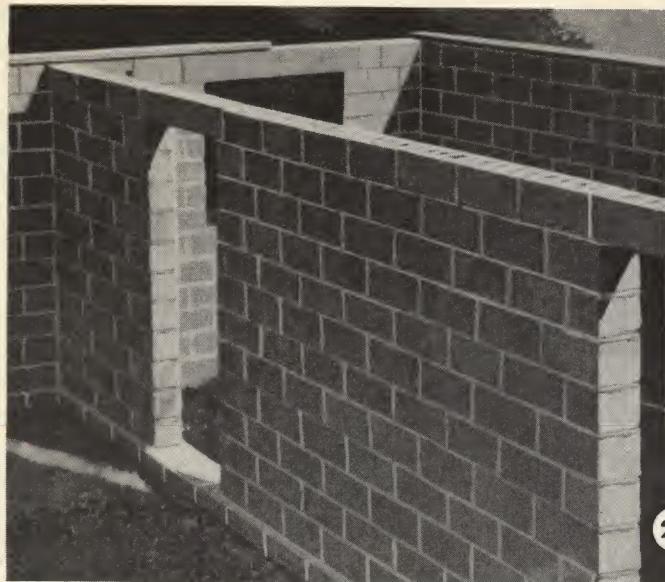


USE OF WOOD LINTEL



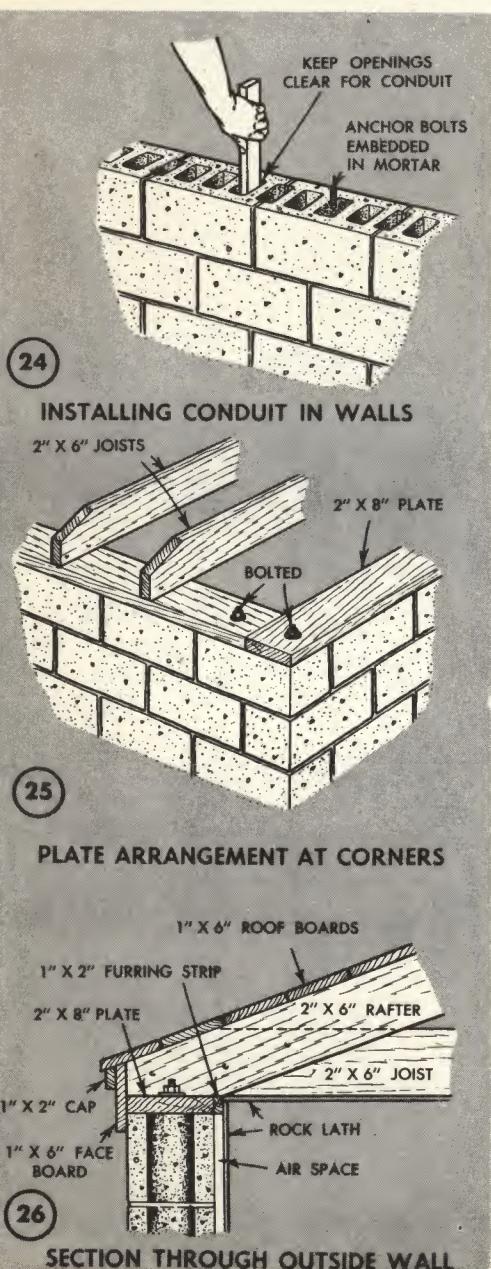
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FORM FOR CASTING WINDOW SILLS



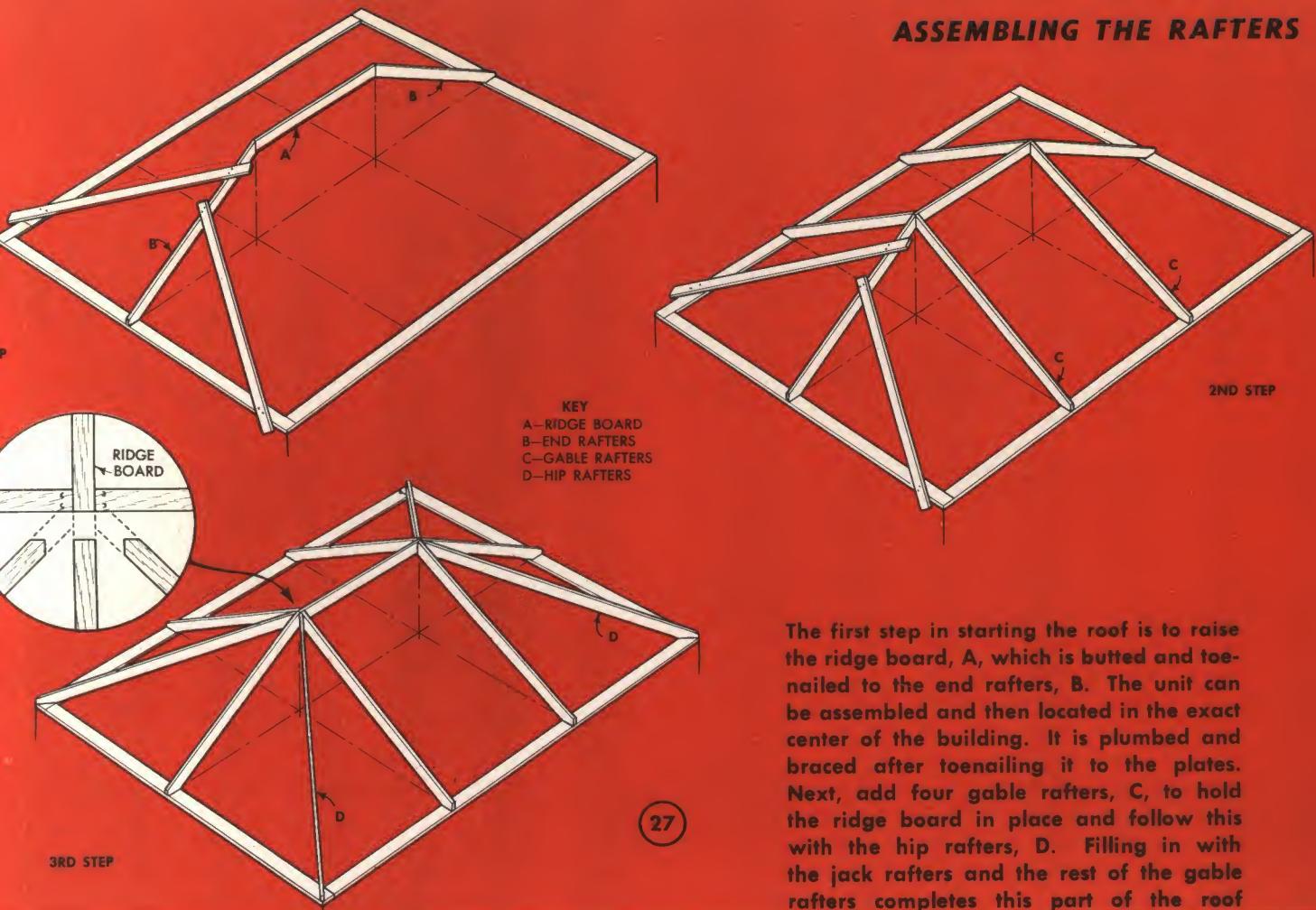
23

Views above show the walls completed, ready for the plates, which are firmly held by bolts embedded vertically in the mortar



Lintels (supports at the tops of the window and doorway openings) can be either wood or precast reinforced concrete. You can cast them in forms of suitable size and reinforce them with iron rods. Keep in mind that they must be made long enough to project into the wall on both sides of the opening a distance equal to one half the length of a concrete block. Fig. 21 shows how to make them of wood. These, too, must be long enough to project into the walls the same as the precast type.

When laying up the walls, check both the window and door openings frequently with a level as shown in Fig. 19 to be sure you are keeping them plumb. Also, keep in mind the electrical wiring for wall switches and receptacle boxes. If you use the regular size of boxes for these, it will be necessary to run the conduit down the outside walls through the openings in the blocks. If this is done, be sure that the openings are kept free of mortar or other obstructions at these points. This can be done by pushing a stick down the openings as the walls are laid as in Fig. 24. However, if you use the shallower boxes, this is unnecessary. When shallow boxes are used, the conduit is run between the furring strips and the wall, the boxes being recessed into the concrete blocks. See the section on electrical wiring.



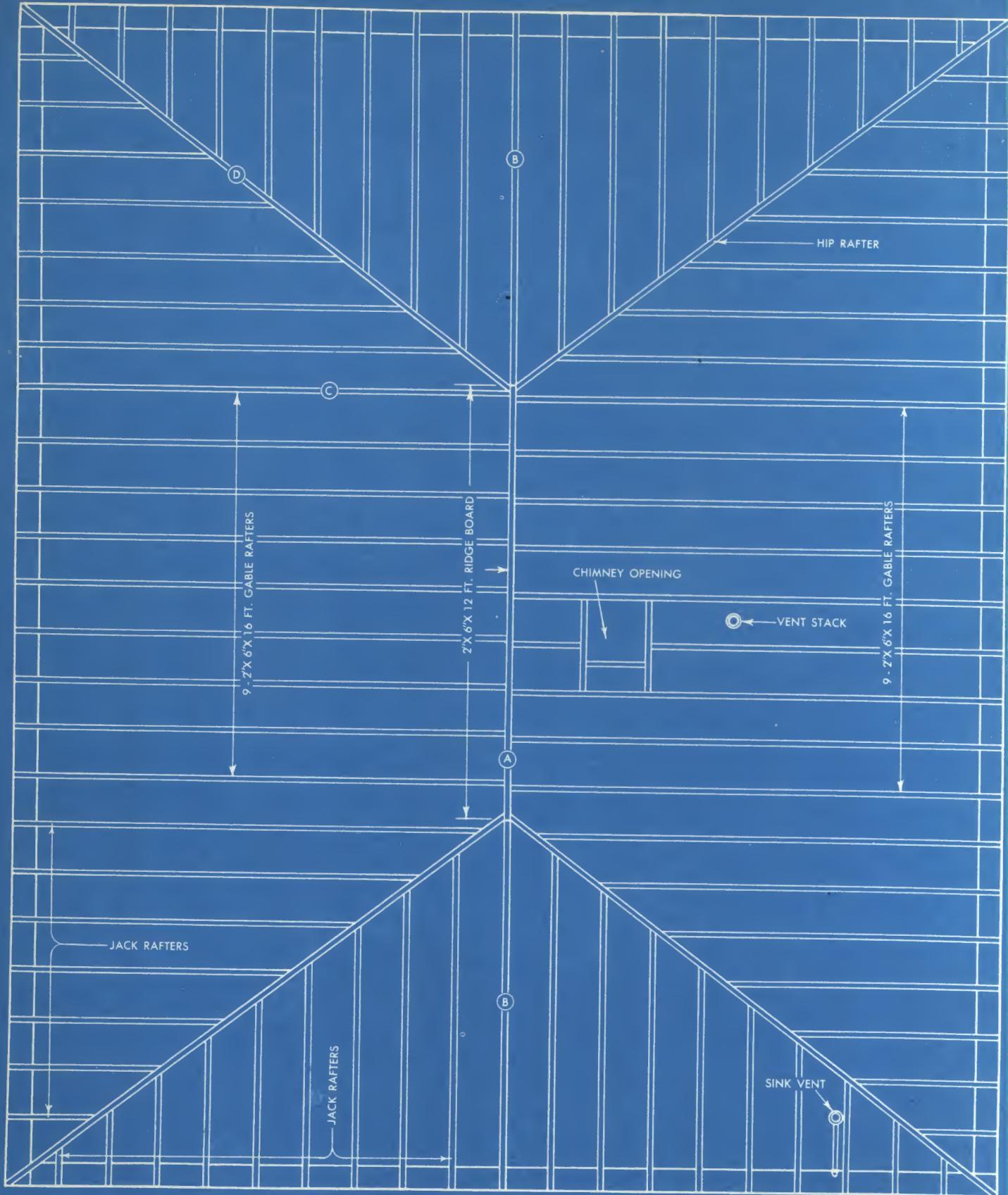
The first step in starting the roof is to raise the ridge board, A, which is butted and toenailed to the end rafters, B. The unit can be assembled and then located in the exact center of the building. It is plumbed and braced after toenailing it to the plates. Next, add four gable rafters, C, to hold the ridge board in place and follow this with the hip rafters, D. Filling in with the jack rafters and the rest of the gable rafters completes this part of the roof

PLATES AND CEILING JOISTS

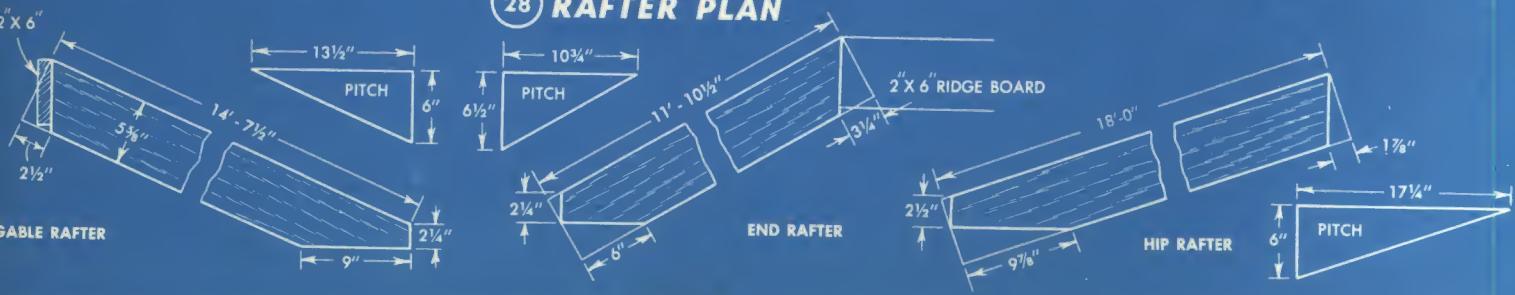
With the outside and main bearing walls completed you are ready to put on the wall plates and install the ceiling joists. Fig. 23 shows workmen placing the plates. It also gives a good view of the completed main bearing wall. The plates are 2 x 8-in. stock, and are anchored to the wall by long $\frac{1}{2}$ -in. bolts set in the openings of the top course of blocks. Stuff the openings with paper down about 8 or 10 in., fill with mortar and then insert the bolts, head first, allowing them to project enough to take the plates and nuts. Space the bolts about 4 ft. apart except at the corners, which are treated as indicated in Fig. 25. Use 2 x 8-in. plates on the outside walls and use 2 x 4-in. plates on the main bearing wall. Notice in the lower right-hand-corner detail of the joist plan in Fig. 29 that the main bearing-wall

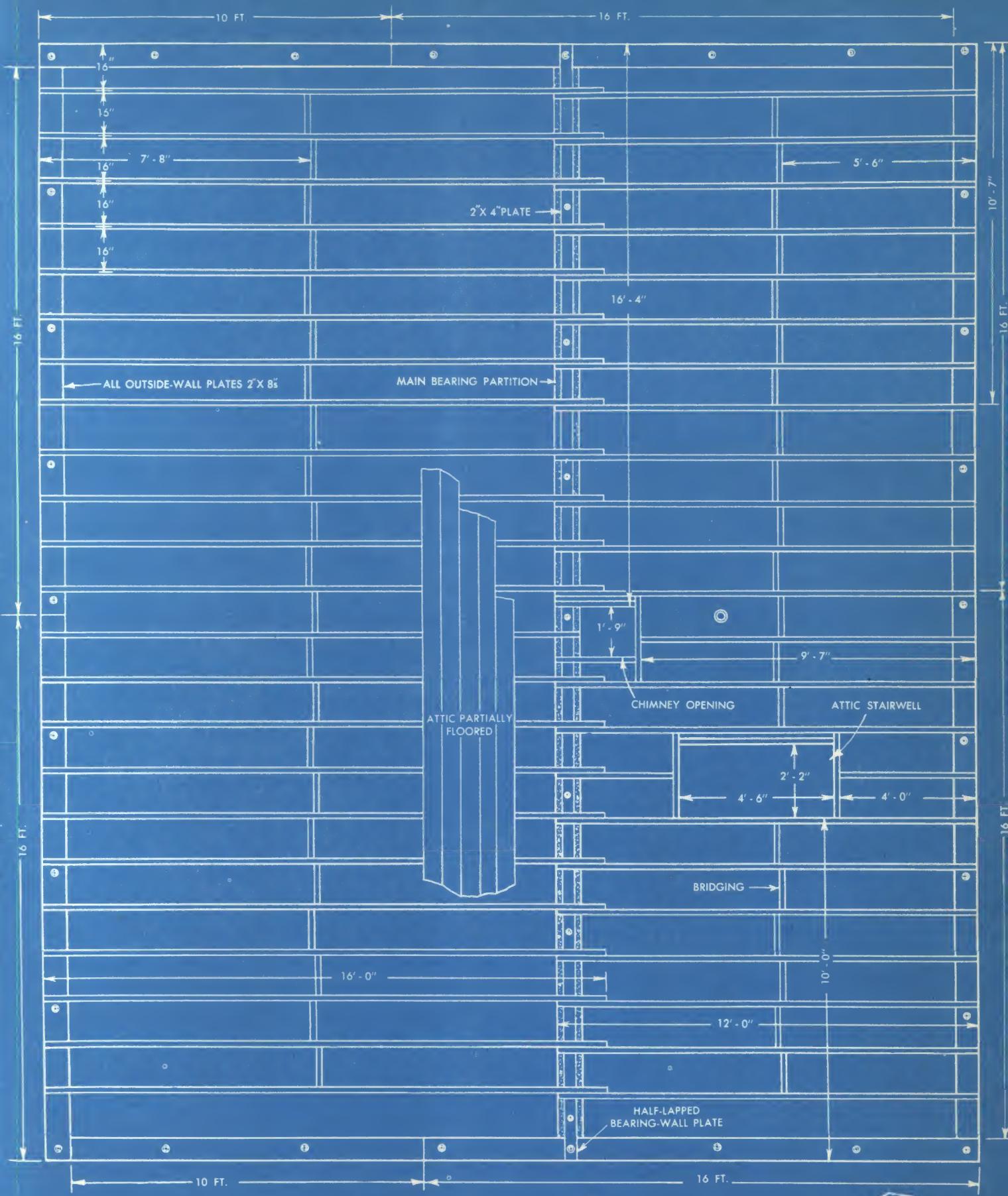
plate is half-lapped into the outside wall plate at each end and bolted. This is done to help prevent any possibility of the walls pulling apart where they join.

The joists come next. Refer to the joist plan in Fig. 29. These are 2 x 6-in. stock and are spaced 16 in. on centers. Note that two different lengths are required. The joists are lapped at the main bearing wall, nailed together and toenailed to the plates with spikes. See Fig. 32. Study the plan carefully and avoid locating a joist directly above where a partition wall will run under it. The partition walls will project about 4 in. above the lower edges of the joists and you will run into trouble if a joist should come above one of these walls. Measure in from the end walls to locate the chimney opening and the attic stairwell opening. Dimensions of the chimney opening are

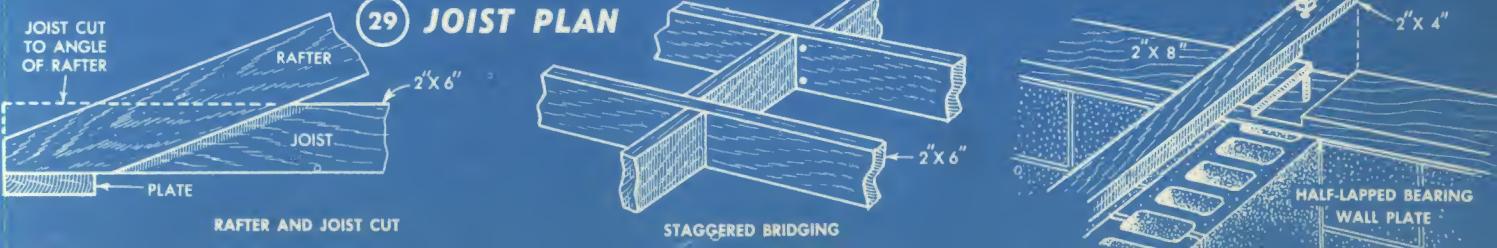


28 Rafter Plan



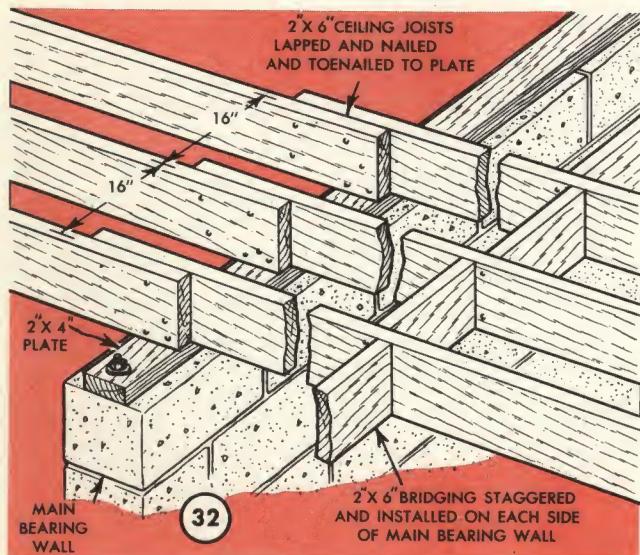


29 JOIST PLAN





Front and rear views above show the rafters in place ready for the roof boards. These can be applied now or the floor may be poured. If bad weather is pending, it is better to go ahead and complete the roof



Joists are lapped at the bearing wall, nailed together and toenailed to the plates, after which the bridging is installed to strengthen and support the joists

not critical, but be sure it is large enough. Size of the stairwell opening will depend on the type of disappearing stair used.

After installing the joists, put in the bridging, which is short lengths of 2 x 6-in. stock staggered for convenience in nailing. The center detail below the plan view in Fig. 29 shows how it is done.

RAFTERS

Cutting and erecting rafters may seem a difficult job, but actually it is simple. While the true length of each of the three main rafters (all others are duplicates) usually is found by stepping off the length with a steel framing square, these scale drawings give the actual dimensions for laying out the plate and plumb cuts with a rule and try square. The small details indicating the rafters at the bottom of Fig. 28 show how this is done on the gable, end and hip rafters. For example, refer to the gable rafter. At one end measure down $2\frac{1}{4}$ in. and mark it. Then from this point, measure 9 in. diagonally to the edge of the rafter and draw a line between the two points. Saw off the rafter along this line to get the plate cut. A try square held against the plate cut will give the line for the $2\frac{1}{4}$ -in. cut. Plumb cuts are indicated at the upper ends of the rafters and are determined in the same way. For those who prefer to use the carpenters' method, the rise and run measurements of the pitch pattern also are given.

ERECTING RAFTERS

The three views in Fig. 27 show the progressive steps in erecting the rafters. The first step is to raise the ridge board, A, which is supported by two end rafters, B. These are butted and toenailed to each end of the ridge member. This is done with the three pieces lying flat on the joists, after

which the assembly is raised, located in the exact center of the building, and then plumbed and toenailed to the plate. Braces will help keep it in place. The second step is to put in four gable rafters, C, locating them at or near the ends of the ridge board, followed by the third step, which consists of installing the hip rafters, D. Notice in the circular detail how the plumb ends of these rafters are beveled. Complete the rafter job by filling in with the jack rafters and the rest of the gable rafters. Spacing of the latter is determined by the spacing of the joists, which means that the first gable rafters, C, may not necessarily come right at the ends of the ridge board. Also notice in Fig. 34 how each hip rafter must be notched near the lower end to fit over the first joists. Figs. 30, 31 and 33 show rear, front and corner views, respectively, of the house with the rafters erected. After setting the rafters and nailing them in place, both to the plate and the joists, they should appear as pictured in the sectional detail shown in Fig. 26.

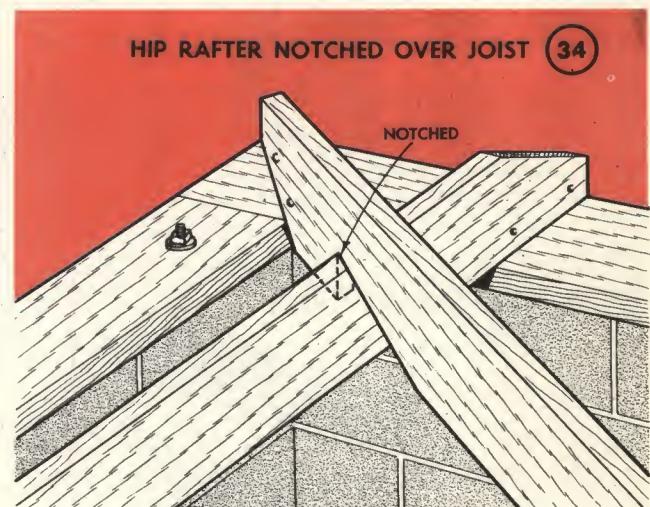
SEWERS

If you haven't as yet put in the underground part of the sewer system, do it next. Study the sewer plan in Fig. 35 and also the lower right-hand detail of Fig. 36. You should experience no difficulty in putting in the system as every length of soil pipe and all fittings are shown. First check with local authorities as to whether the codes require that a licensed workman do this work. If not, go ahead and do it yourself.

In the sewer plan of Fig. 35 we are assuming that the main sewer comes in from the street. If it enters from the alley, you can easily work out a plan, keeping the various inlets to the sewer located exactly as they are on the original plan. The change

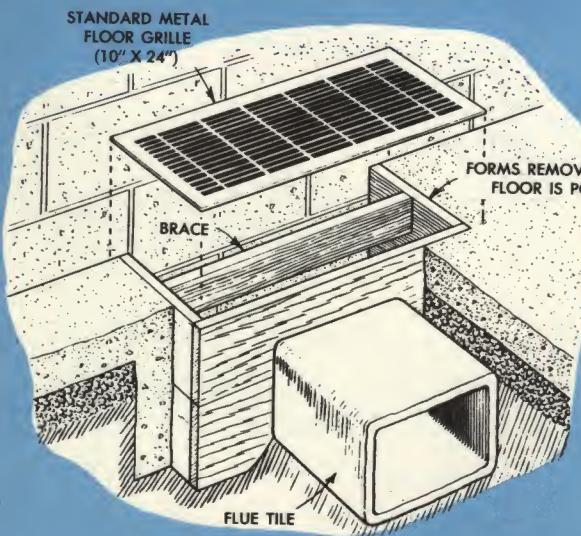
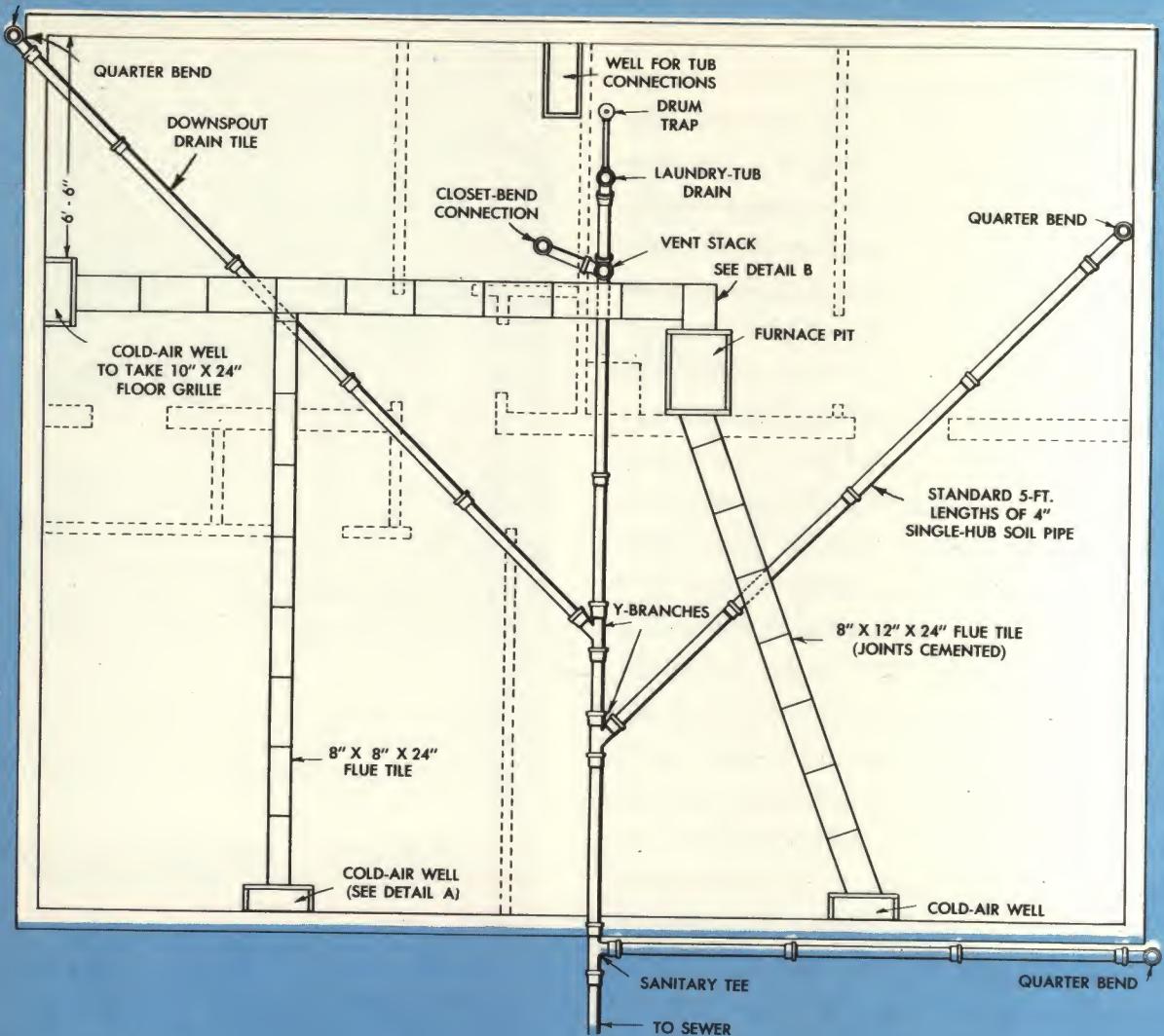


Corner view above shows the jack rafters on each side of the hip rafter, and the detail below indicates how the hip rafters should be notched to clear the joists

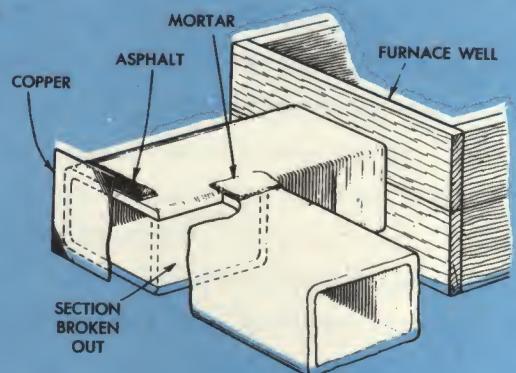


is just a matter of relocating the branch lines to suit. All underground sewers are made of standard 5-ft. lengths of single-hub soil pipe and fittings, except the main line coming in from the street sewer to the house, which is regular clay sewer tile.

There are three lines under the house. One runs to the right front corner for a downspout, another to the utility room for



HOW COLD-AIR WELLS ARE FORMED
(DETAIL A)



RIGHT-ANGLE TURN WITH FLUE TILE
(DETAIL B)

the bathroom and laundry tubs and a third one to the kitchen for the sink. The openings into the sewer inside the house should be located so that they will come flush with, or just slightly above, the floor when it is poured. Wed paper into the exposed openings to keep them clean until ready to connect into them. Notice in Fig. 38 how a recess has to be chipped into the blocks to take the quarter bend in the kitchen. You will have to do this all the way up the wall so that the vent, which is $1\frac{1}{2}$ -in. pipe, can be set in flush with the furring strips later. The toilet and tub vent can be erected at this time.

CALKING SOIL PIPE

To calk the joints of soil pipe laid horizontally you will need a device called a joint runner, which is shown in the upper right-hand detail of Fig. 36. It forms a dam when clamped around the hub of the pipe so that molten lead can be run into the joint. Steps in calking soil pipe, laid either vertically or horizontally, differ only in this respect. The various steps are shown in Fig. 36. Cutting soil pipe is not difficult. First score it with a cold chisel as indicated in the upper left-hand detail, after which a few sharp taps with a hammer will break it at the score.

COLD-AIR RETURNS

The original house was heated with a hot-air furnace and the cold-air returns were run under the floor. Installing these is the next job before pouring the floor. The upper detail of Fig. 35 shows the plan. There is a return below the picture window and one in each of the bedrooms.

Vitreous sewer tile can be used for the returns, but common clay flue tile provides an inexpensive substitute. All returns terminate in a pit or well in the utility room

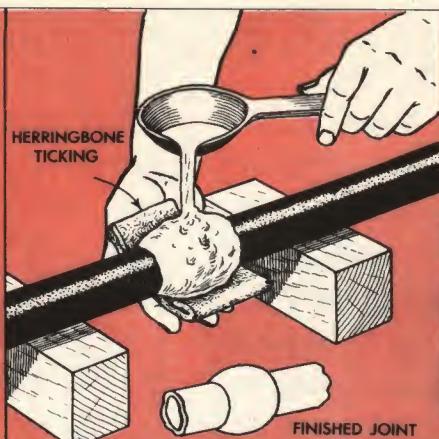
over which the furnace is placed. The type of furnace you use will determine the type of pit to make. The tile are laid in trenches just under the gravel fill for the floor, and the joints are covered with mortar. Detail A shows the cold-air wells which are poured concrete and are formed to take a standard floor grille, and detail B shows how to make the one right-angle bend at the furnace pit for the return leading to the rear bedroom. Construct the forms in such a manner that they can be removed easily after the concrete has set. The roof boards and roof covering can be installed at this time, or you can do this work later, as you wish. If there is a chance of bad weather, it would be best to get the house covered as soon as possible. Refer to "Roof and Covering."

With the sewer lines and cold-air returns in you are about ready to pour the floors. But first set the vertical tile for the down-spouts, put coarse gravel over the drain tile around the footings and then fill in around the foundation. Now is a good time to run the gas line from the meter location in the utility room to the kitchen for the gas stove. It will be a good idea to check with the gas company on this so that you use the correct kind of pipe and install it properly.

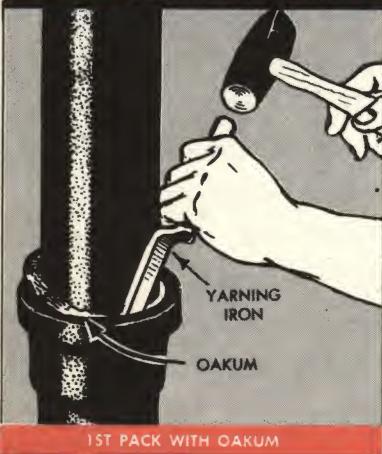
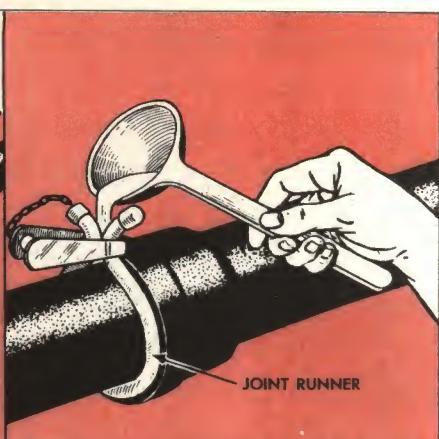
When the pipe is in place, level off the ground for the floors and pour a footing 18 in. square and 12 in. thick for the chimney. The footing should be high enough to penetrate the floor part way when it is poured. The cross-sectional view through the house in Fig. 43 shows this footing and gives an idea of how the floor appears. Notice that the floor overlaps the projecting surfaces of the foundation blocks. Therefore, the ground should be leveled and firmed by tamping to bring it at least 5 in. below the top of the foundation. Then apply $4\frac{1}{2}$ in. of coarse gravel, or enough to come flush



CUTTING SOIL PIPE



WIPING LEAD JOINT



1ST PACK WITH OAKUM

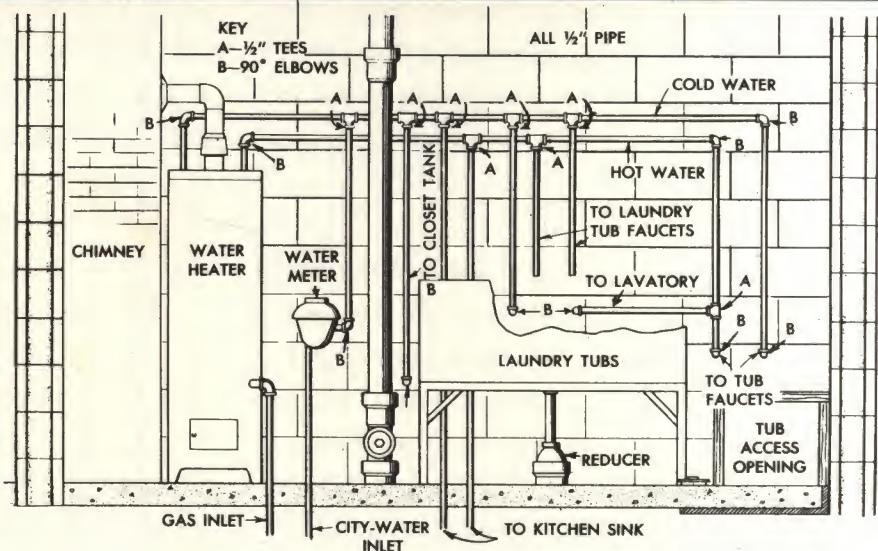


2ND FILL WITH LEAD



3RD TAMP FIRMLY

CALKING SOIL PIPE



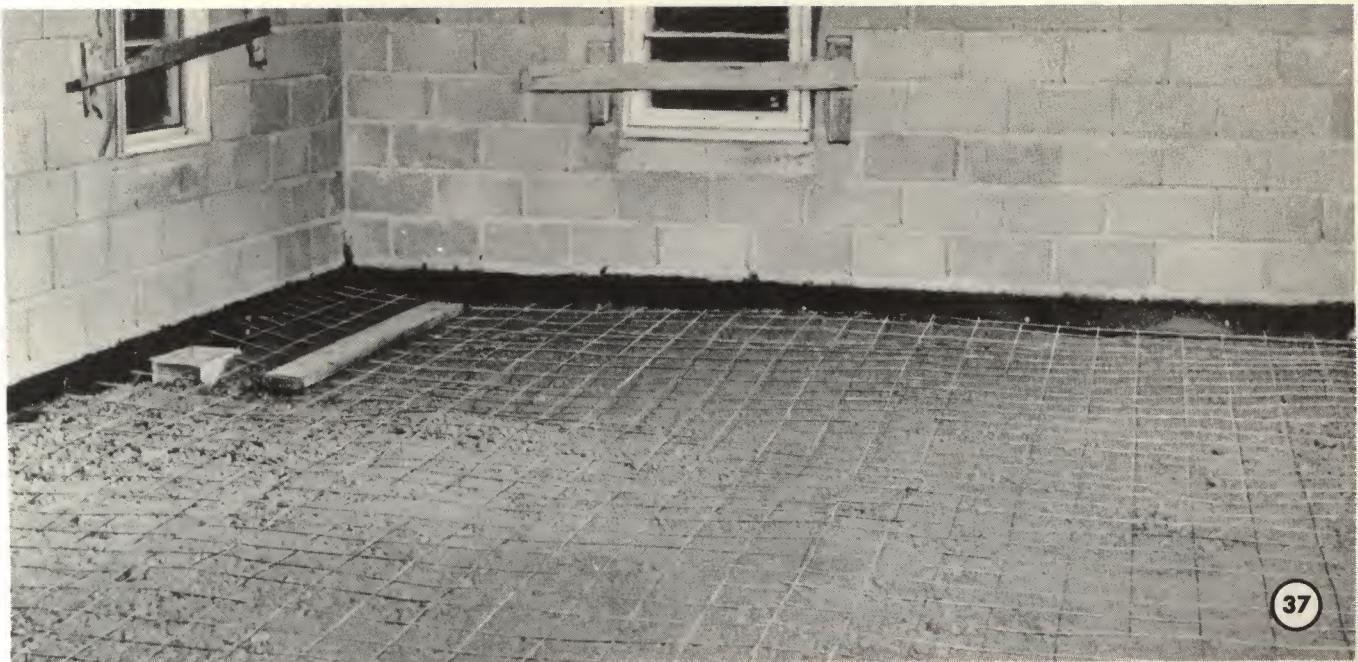
The detail above gives locations of pipe and fittings for water and gas lines, while lower detail shows the sewer system. Parts are keyed for size and name

KEY
A—90° ELBOW
B—1 1/2" PIPE
C—UNION
D—1 1/2" TEE
E—SANITARY TAPPED T-BRANCH
F—EIGHTH BEND
G—CLOSET BEND
H—SANITARY TEE
J—LAUNDRY-TUB DRAIN
K—CLEAN-OUT TEE

Y-BRANCHES

4" X 8" DRUM TRAP

Y-BRANCH

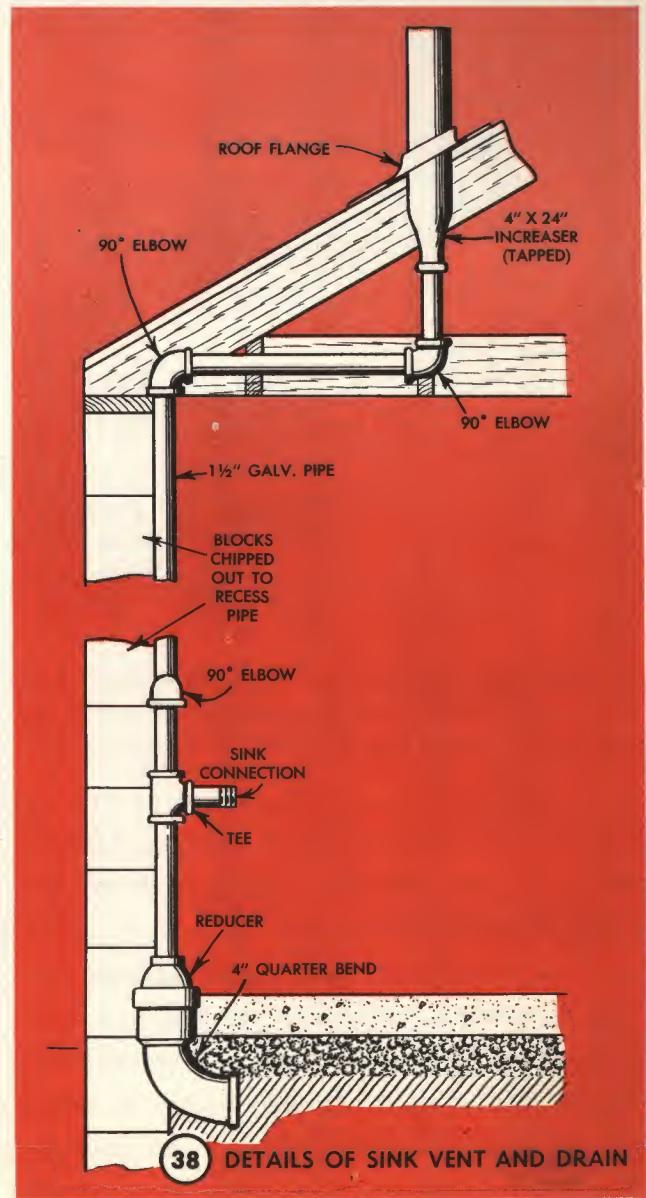


with the foundation, and tamp it firm, being sure that the surface is uniform. Cinders are not recommended as a substitute for gravel as they are subject to some deterioration over a period of time which would result in shrinkage of the fill and possible breakage of the floor.

POURING THE CONCRETE FLOORS

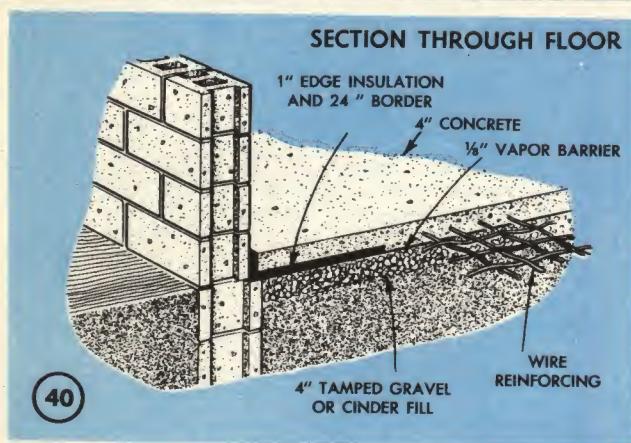
This will be the hardest job on the house unless you have a mixer. You'll save a lot of labor if you rent one for this work. Over the gravel fill pour a grout coat $\frac{1}{2}$ in. thick. The grout consists of a thin mix of cement, 1 part, and sand, 3 parts. Float this coating with a long straightedge, such as a 1 x 4 or 1 x 6-in. board that has a true, straight edge. The grout coat provides a smooth surface on which to place the vapor barrier or membrane. This consists of roofing felt laid in hot asphalt. When the grout coat has hardened mop it with hot asphalt and lay 15-lb. asphalt-saturated roofing felt over the sticky surface, pressing the felt firmly in contact with the asphalt.

To prevent transfer of cold through the





39



40

The detail above shows how the concrete floor is insulated at the walls to prevent transfer of cold to the floor and thus give rise to problems of condensation

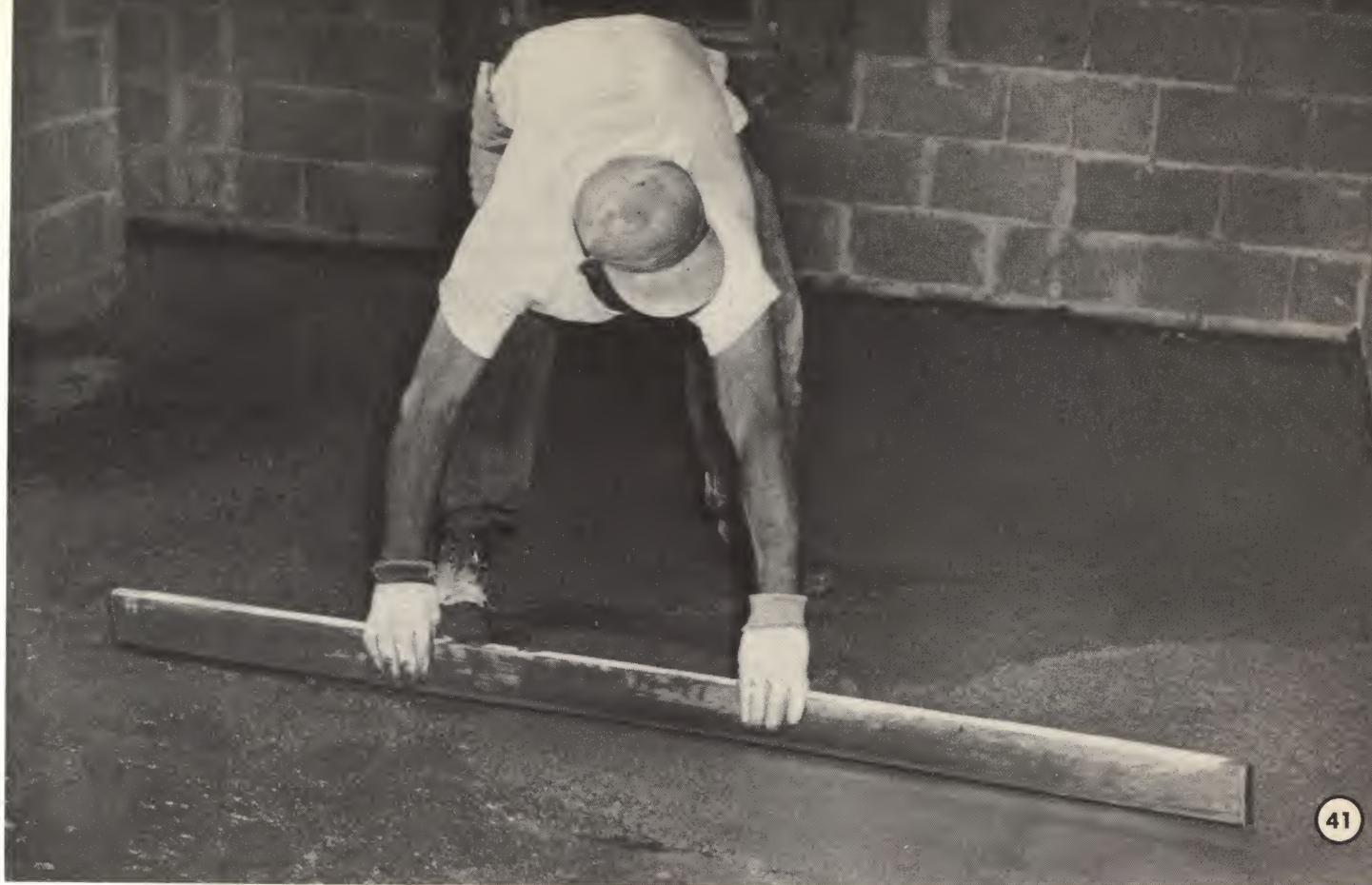
walls to the floor and thus cause condensation problems around the floor near the walls, place a 24-in. width of 1-in. rigid insulation on the vapor barrier adjacent to the side walls to extend to the finished floor level. Figs. 40 and 43 show the installation clearly. This type of insulation is made especially for this purpose and can be purchased from your dealer. It is unnecessary

to use the insulation at the main bearing wall, although a strip of it could be used edgewise to serve as an expansion joint. While the floor is unlikely to expand enough to cause trouble, except possibly in areas where weather temperatures change rapidly, expansion joints between the walls and floor are a good safety measure against possible cracking.

Next comes pouring of the floor. When doing this take precautions to avoid puncturing the vapor barrier, either with a wheelbarrow or otherwise. Use a stiff mix of cement, 1 part, sand, 3 parts, and stone, 4 parts, for the lower or base part of the floor. Pour this mix to within 1 or 1½ in. of the surface of the finished floor, level it fairly well and then tamp it firmly. Over this lay 40-lb. reinforcing mesh and press it into the surface. Fig. 37 shows the mesh in place ready for the finish coat.

This coat consists of a mix of cement, 1 part, and sand, 2 parts, and can be poured in sections for easy smoothing and finishing. Both the base and finish coats should be poured the same day in order to get a good bond between them. You can, of course, divide the floor-pouring job into two parts, the area between the rear wall and the main bearing wall and the area between the front wall and the main bearing wall.

Fig. 39 shows one way of leveling the surface of the finish coat. In this instance, 2 x 4s are laid over the reinforcing mesh and tamped down so that their upper surfaces are at the desired height of the finished floor, using a straightedge and carpenter's level to assure uniform height. When the 2 x 4s are at the correct height, the finish coat is poured and floated level with a long straightedge as in Fig. 41. The 2 x 4s are removed when troweling and smoothing the finish coat and the depressions formed by



them are filled with cement and smoothed with the rest of the floor surface. After leveling, the finish coat should set until fairly stiff—test it at regular intervals—after which it is smoothed with a wood float and steel trowel. It is not easy to get a smooth finish if you are inexperienced, but if you work carefully, it can be done. This is one reason for pouring the finish coat in small sections; it gives you a chance to get each section smoothed before it sets too hard. The floor should cure at least two or three days after hardening and should be kept wet during this time. Cover it with canvas or burlap and sprinkle at regular intervals.

PARTITION WALLS

Fig. 42 gives the elevations for all the partition walls. Each is keyed by a letter with the floor plan shown in the front of the book. Thus, by referring to both the plan

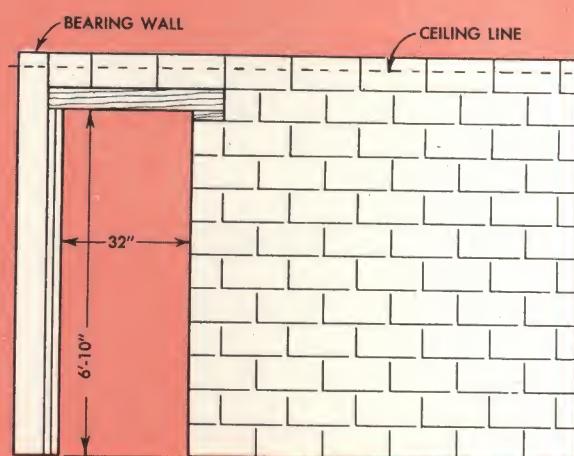
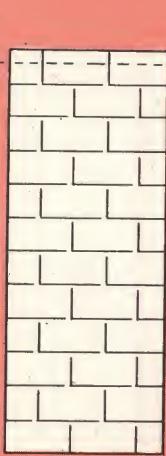
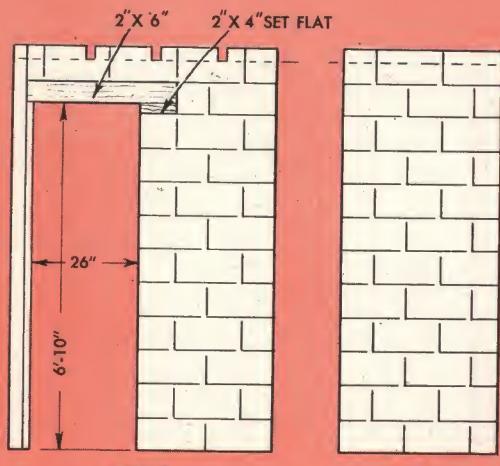
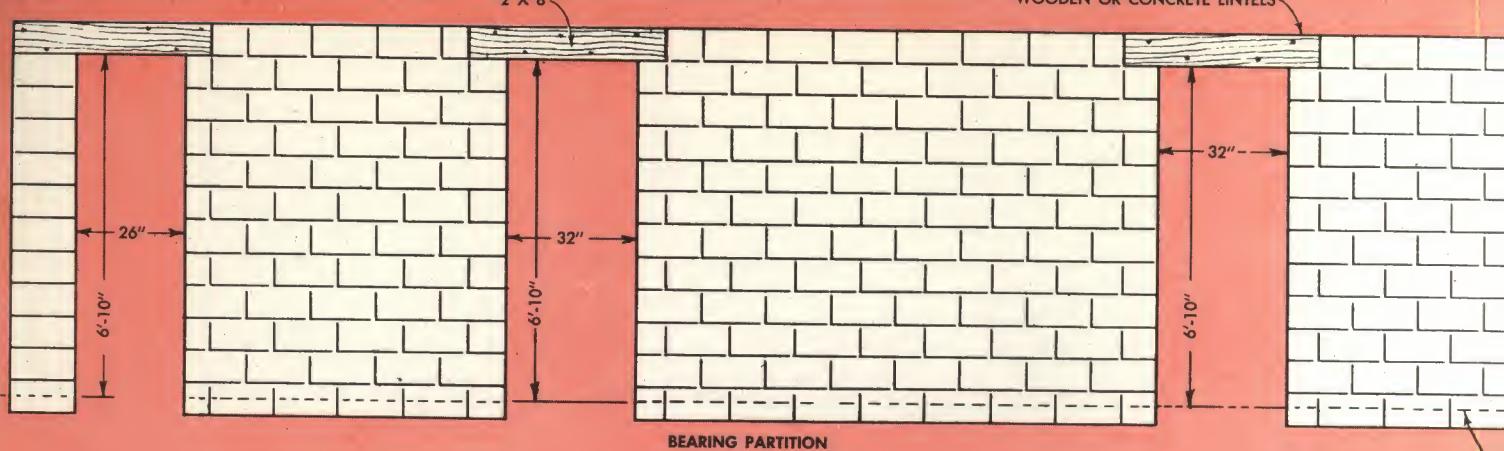
After pouring the finish floor coat, it is leveled by floating the wet cement with a long, true straightedge

and the elevation, you can determine the position of each wall in the house.

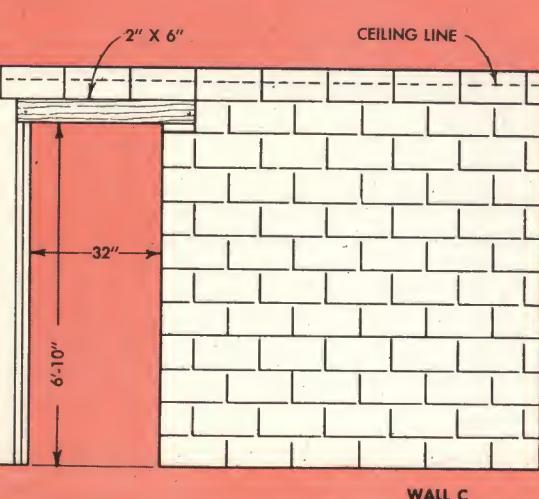
Notice, as indicated by the dotted lines, that all partition walls extend above the ceiling line, and that two of them, walls B and E, which run at right angles to the joists, have the upper rows of blocks chipped out roughly to fit up under the joists.

The reason that the partition walls extend above the ceiling line is that they rest on the floor, which is approximately 4 in. above the foundation, thus making the partition walls 4 in. higher than the outside walls on which the joists rest.

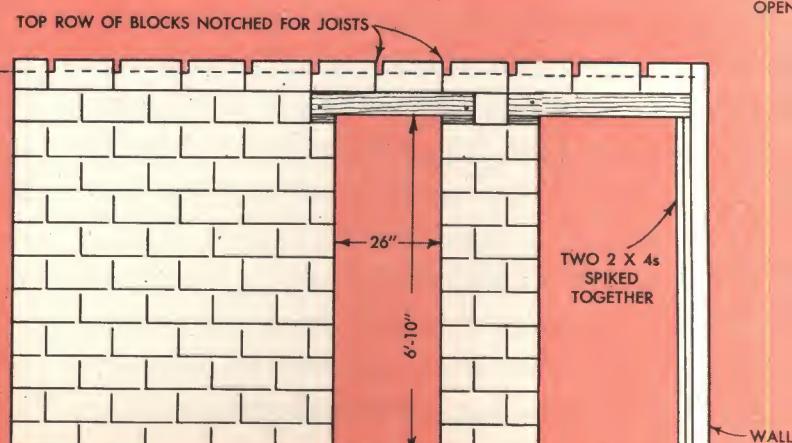
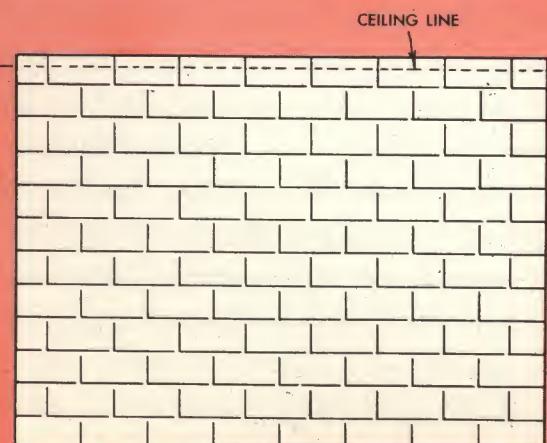
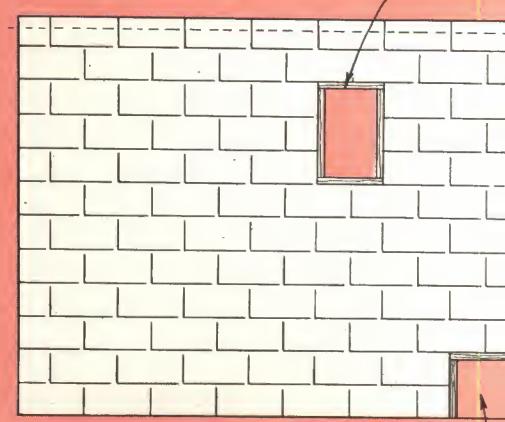
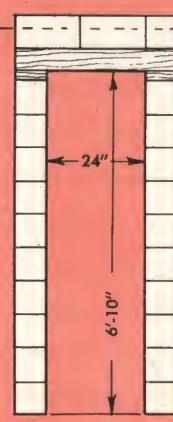
The number of full and half blocks for each wall can be determined by counting the blocks in the wall shown in the elevation. Locations of the door openings and their sizes also are given. Notice in all the door



CONC
FLOOR



WALL C



openings except those in the main bearing wall, that doubled 2 x 4s are nailed to the blocks to reduce the size of the openings and provide nailing surfaces for the frames and casings. If you use lightweight blocks, use steel-cut nails for this purpose, but if the walls are concrete blocks, masonry nails that can be driven into the blocks will be necessary.

The blocks in the partition walls are laid in the same way as those in the other walls, except that 4-in. blocks are used instead of 8-in. blocks. Door headers are 2 x 6s set on edge and blocked up to bring them flush with the top of the wall. Sizes of the medicine-cabinet and tub access openings shown in wall H are determined by the size of the cabinet and type of tub fittings used.

THE CHIMNEY

After completing the partition walls, you are ready to build the chimney. Figs. 43 to 47 inclusive show the installation. The chimney is laid up of six bricks in each course inside the house and then increased to eight bricks to the course above the roof, the wider dimension starting just below the rafters as indicated in Fig. 43. The increased width is mostly for sake of appearance. Therefore, if you do not dislike the appearance of the smaller-size chimney above the roof, it can be made the same size from top to bottom.

Use a well-burned brick for the chimney and start to lay it up as shown in Fig. 47. Make the joints between the brick $\frac{1}{4}$ to $\frac{3}{8}$ in. wide, and use a mortar mix consisting of cement, 1 part, hydrated lime, 1 part, and clean sand, 6 parts. Drop plumb lines from roof to floor to serve as guide lines and install a cleanout door near the floor. Set the first tile of the chimney liner after you have laid up a few courses of brick. The

liner is regular 8 x 8-in. flue tile. Apply mortar carefully to the tile joints and be sure that it is smoothed down neatly inside the flue. Mortar projecting from the tile joints provides ledges for soot to collect and may even set up a turbulence in the draft and thus cause inefficient furnace operation.

Start corbeling (increasing the width) the chimney about seven courses below the roof. Corbeling is done by laying succeeding courses to overhang the preceding course not more than 1 in. It will be necessary to set in small pieces of brick in each corbeling course to gain the necessary width. Be sure there is a clearance of at least $\frac{1}{2}$ in. between the chimney and any wooden parts, such as joists, rafters, etc. Don't forget that the chimney must be flashed at the roof boards. Fig. 45 shows how this is done. Use light sheet-metal or copper strips for the flashing and embed the upper end of each strip in a mortar joint as indicated.

When the chimney has been built to the required height above the roof, it should be capped. Fig. 44 shows two ways of doing this. In the left-hand detail mortar is merely sloped from the top of the flue lining to the edge of the bricks. The right-hand detail shows a more decorative and efficient cap. Here a form is provided for casting the cap. The form overhangs the brick from 1 to $1\frac{1}{2}$ in. When you assemble the form, let the nailheads project for easy removal when dismantling the form.

ROOF AND COVERING

If you haven't already put on the roof boards, which are 1 x 6s, this is the next job. But, first, cut down the projecting ends of the ceiling joists flush with the upper edges of the rafters. A hand ax or sharp hatchet will make quick work of this job.

Then put on the cornice, which consists of a 1 x 6-in. board nailed to the ends of the joists and capped with a 1 x 2-in. strip. The important thing to keep in mind when laying roof boards is to stagger the joints so that two of them do not come on the same rafter, one directly above the other.

If some of the boards are warped badly, they can be pried into place with a lever, which is held against a block nailed to one of the rafters. Lay the first roof board to slightly overhang the cap strip and then proceed up the roof. It will be necessary to miter the boards at the hip rafters.

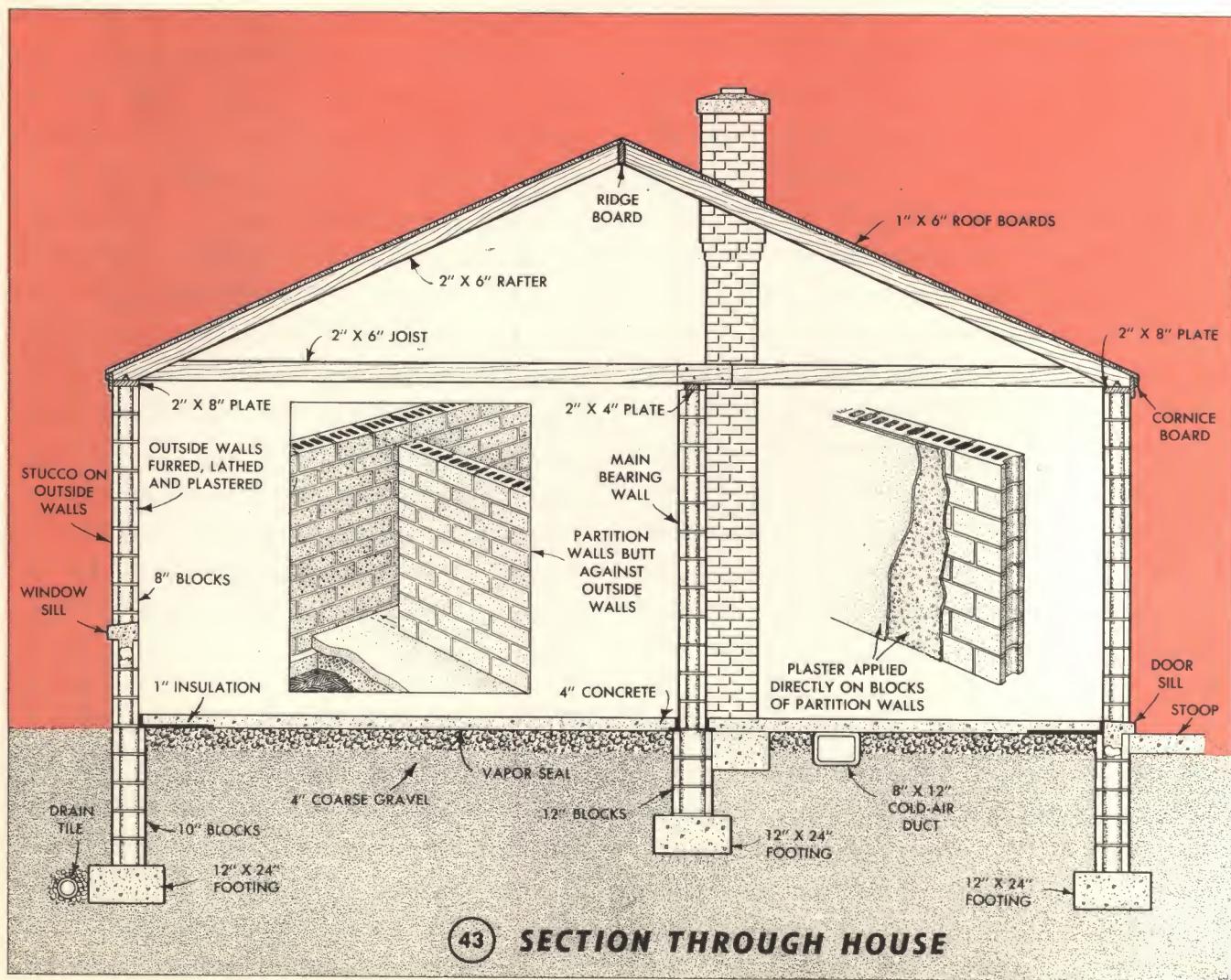
After applying the roof boards, flash

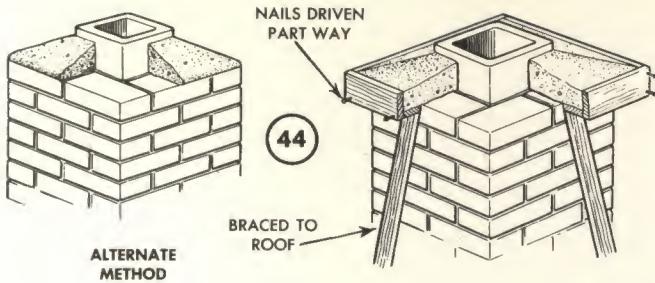
This cross-sectional view through the center of the house gives a picture of construction from footings to roof

the vents and install ventilators in opposite sides of the roof. Fig. 48 shows the flashing for the bathroom vent, the other vent, for the kitchen, being handled in the same way.

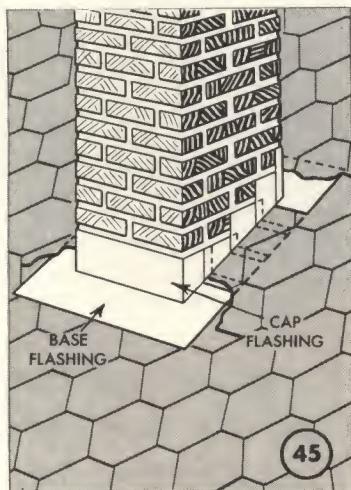
A purchased ventilator is shown installed in Fig. 49. There are numerous types of these and selection is a matter of preference. Your house now should look something like the picture in Fig. 50, minus the window sash.

Since it always is a good idea to get the house under cover as soon as possible in case of bad weather, the next job is to apply the shingles. The roof covering to use is a matter of choice. Fig. 51 shows the hexagon type being applied and Fig. 52 shows how to start the job and also the more common types of shingles available.





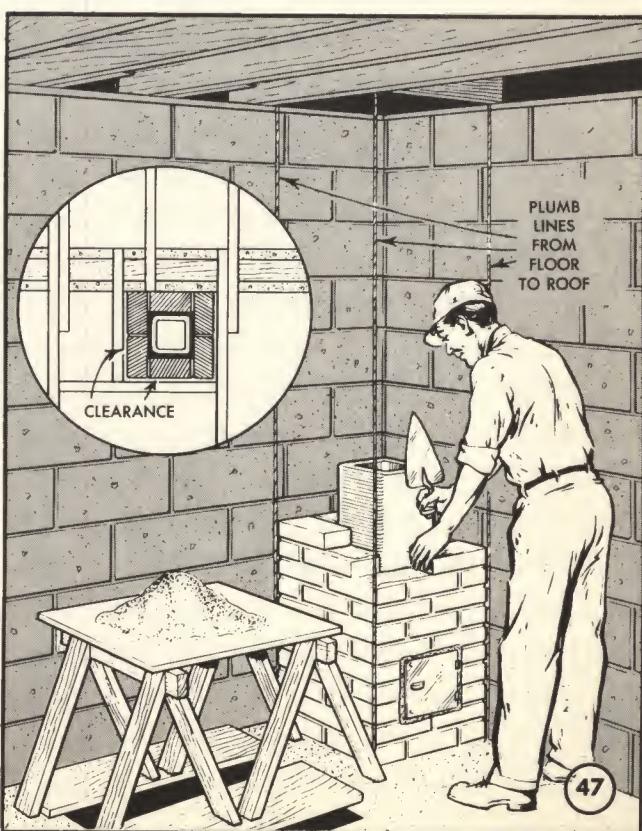
These three views show steps in building the chimney. The two details above give two methods of capping it, while the one at the right shows how the metal flashing is embedded in mortar, then is bent down and worked in with shingles

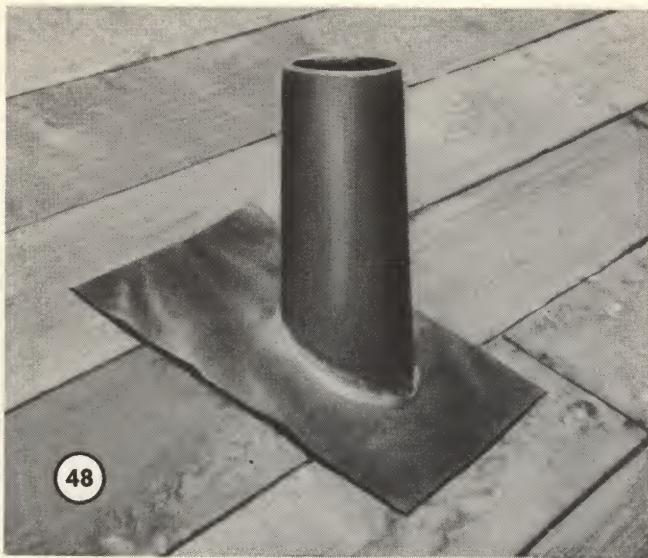


Shingling a roof isn't difficult if you use the self-aligning asphalt shingles. Simply lay them end to end, drive four nails in each one and keep them aligned with the notches in each row. However, before laying any shingles, the roof should be covered with roofing paper, or roofing felt. This is purchased in rolls 36 in. wide, and is a waterproof, asphalt-impregnated material. The felt should be cut into strips of the required length and then should be applied vertically from ridge to eave. A nail driven here and there in the strips will keep them in place.

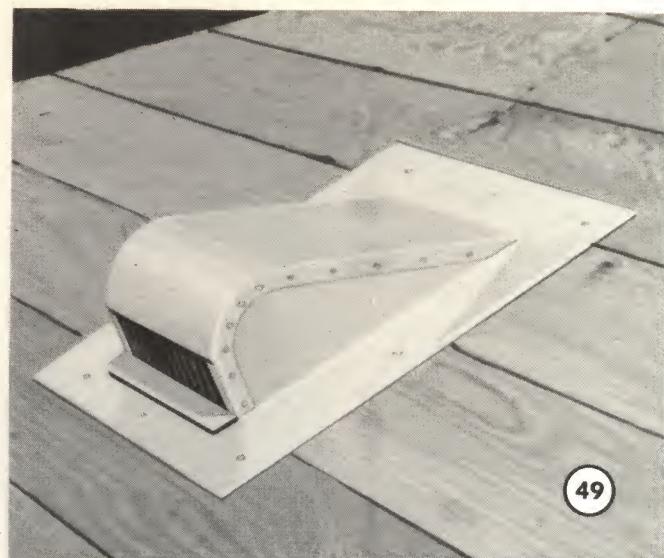
To start shingling, first lay a strip of special felt, which you can purchase from your dealer, as indicated in the left-hand detail of Fig. 52. Let the felt overhang the first roof board $\frac{1}{4}$ to $\frac{3}{8}$ in. This overhang is necessary because there are no shingles under the starting row to back up the slots and thus prevent leaks. Start the first course of shingles flush with the lower edge

When starting the chimney, plumb lines are stretched from ceiling to floor as guides in laying it up straight. Notice the clearance next to all wooden parts





48



49

Metal flashing is used around all vents and ventilators to prevent water seeping down around them

of the felt strip. When you come to a vent or ventilator apply the shingles so they cover the upper half of the flashing metal and go under the lower half to prevent rain from running under them. When you reach the chimney, study Fig. 45. Notice that the shingles cover the flashing metal, which has already been installed, behind the chimney, but at the sides, each shingle is under one half of the flashing strip above it and over the top half of the strip below. Each row of shingles is handled in this manner along the sides of the chimney, but at the bottom the base flashing goes over the shingles. In addition to the flashing metal, flashing compound, which is a mastic material, should be applied around the chimney, vents and ventilators as further protection against leakage. The ridge of the roof and the shingle joints at the hip rafters may be capped with sections of shingles laid to overlap, or regular roll strips made for this purpose. This completes the work outside the house for the present, except that it will be a good idea to give all exposed wood surfaces a priming coat of paint to protect them until the house is ready for the final paint job.

Ventilators are used on opposite sides of the roof. There are various types and sizes of these available

FURRING THE OUTSIDE WALLS

Your next job is to put furring strips around the outside walls for attachment of the plaster base. It is necessary to furr outside walls to provide a dead-air space between the lath and the blocks. The air space not only acts as insulation against transfer of cold or heat, but also serves to some extent as a barrier against the transfer of moisture to the plaster. The furring is 1 x 2-in. strips spaced 16 in. on centers and nailed to the block wall, using either masonry nails or special fasteners made for this purpose. Fig. 53 shows the strips in place in one corner of a room. Also, notice that the vertical strips butt against horizontal strips at the ceiling and floor. Those at the ceiling serve as a nailing base for the plaster base as well as a nailing base for moldings, and those at the bottom serve as a nailing base for plaster grounds and baseboards.

GAS AND WATER LINES

If the gas and water lines above the floor haven't as yet been installed, you can complete this job now. Refer to Fig. 36 for the plan. All pipes are shown and the fittings are



all keyed. It will be necessary to chisel holes through the bathroom wall for the lavatory and bathtub lines. If you use faucets in the wall above the tub, be sure that the lines project through the walls the correct distance for attaching the faucets. Use pipe dope on all joints and screw up the fittings tightly. If you put in the gas lines yourself, have the local gas company check the installation before putting it into service.

VAPOR SEAL

As mentioned before, a vapor seal is used in the outside walls as well as under the floor. The seal in the wall serves a dual purpose; it prevents any moisture that may pass through the blocks from the outside from coming on through the plaster, and, in winter it prevents moist warm air in the rooms that penetrates the plaster from coming in contact with the cold blocks and condensing, thus causing the walls to be damp. On the original house, asphalt-impregnated paper was used and placed behind the furring strips as shown in Fig. 53. However, there are commercial papers made especially for this purpose which are more efficient than

This is a view of the house with the roof boards on and the windows in place. Stucco covers block joints

the asphalt paper. The commercial papers are installed over the furring strips directly behind the plaster base as indicated in Fig. 54. Notice that the paper is bowed-in or cupped between the furring strips. This forms air spaces between the blocks and paper and between the plaster base and paper.

INSTALLING DOORS AND WINDOWS

Door and window frames purchased from a lumber dealer usually come flat and have to be assembled, but this is not difficult as all parts are precut. A study of the details in Fig. 18 should enable you to assemble them without difficulty. If you use metal windows as was done in the original house, these units come already assembled in most cases. When assembling wooden frames, set the members in white lead as you put the parts together and then paint the entire assembly to protect it against moisture.

When setting the window and outside door frames, plumb them carefully and then temporarily nail braces diagonally

across the corners to keep them plumb while laying up the walls around them. Also, it is necessary to block them up at the lower end for the concrete sills, which are poured after laying up the outside walls. However, if you prefer to use precast sills, they can be laid at the time of installing the frames. Another thing to keep in mind when putting in wooden frames on concrete sills is to avoid having the frames come in direct contact with the concrete, which may remain damp enough during certain seasons of the year to cause the frames to rot over a period of years. A clearance of $1/16$ to $1/8$ in. is sufficient. Calking compound worked into the clearance space will seal it against entrance of water and cold air.

When setting door frames, plumb them by driving thin wedges, such as strips of shingles, behind them as indicated in the upper left-hand detail of Fig. 71. To keep the lower ends of the frames in place while plumbing them, place a board temporarily between them at the bottom. The length of the board must be the same as the width of the frame. Of the several methods of fastening door and window frames in place, possibly the easiest one in this case is to nail them to the blocks, driving the nails through the frame and wedges into the blocks. Use masonry nails that can be driven into concrete blocks. Since these nails are hard to drive, there may be a possibility of splitting the frame. To avoid this, drill the frames for the nails and countersink the holes so that the nailheads can be puttied over to hide them. The inner edges of window and outside door frames must be set flush with the plaster ground. Therefore, the grounds should be installed at this time. They are 1 x 2-in. strips of wood with one edge set flush with the edge of the window frame or door-frame jamb where they serve as guides

for assuring correct thickness of the plaster.

Interior door frames are set flush with the grounds on both sides of the wall. In fact, it likely will be necessary to rip a strip from these frames as they may be too wide for the 4-in.-block walls.

ELECTRICAL WIRING

In most localities, especially in cities, towns or villages, the codes will require that the wiring be done by a licensed electrician. Check with the proper authorities or your utility company. If there are no restrictions, or if you can get permission to do the job yourself, study Figs. 55 to 64 inclusive and go to it. There are several ways of doing the wiring different from that in the plans shown in Fig. 55, but the method given is one of the simplest and easiest.

Depending upon the wiring requirements of the local code, you have a choice of three types of wiring systems—armored cable, rigid conduit (tubing) and sheathed cable. These three types are illustrated in Fig. 59. Armored cable, also known as BX, is used widely for indoor wiring of both old and new houses. It is available with two or three wires encased in a flexible steel jacket. Rigid conduit, which can be used almost anywhere, is a tubing through which wires are pulled after it has been bent or formed to the desired shape. It is available either in thin-wall or rigid type. Sheathed cable, like armored cable, is purchased with the wires already encased in an outer jacket, which is braided of fabric resistant to moisture and fire. Sheathed cable generally is less expensive than the armored type.

For ease of installation, armored cable was used throughout the original house. Wire sizes and the number of wires in the cable are given on the plan views. Where this information is not given refer to the

table at the left of Fig. 64 and determine the size required. The size of a wire to use in any particular line of a system is determined by the wattage load as given in the table. For example, if the load on the line is likely to total more than 1725 watts, which is the safe load for No. 14 wire, but less than 3450 watts, then you should use No. 12 wire. Wattage load is computed by totaling the number of watts used by the various appliances that may be used at one time on the line. The total should include any electric motors that will be used. When computing motor wattage, the rated amperage is multiplied by the voltage. For example, a motor rated at 4 amps. at 110 volts would use 440 watts.

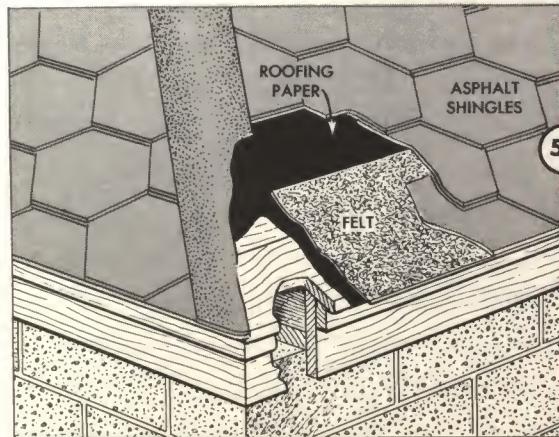
There are three main circuits, one for the base or wall receptacles, one for the ceiling lights and one through the meter, fuse box, etc. By studying the plan and perspective views of each circuit together you should experience no difficulty in following them. The circuit for the meter and fuse box may



seem a little confusing at first, but once these parts are at hand you can easily trace the circuits through them.

Conduit for wall switches and base receptacles located on outside walls and the main bearing wall can be run down through the openings in the blocks as mentioned before and shown in Fig. 62 A, or they can be run between the wall and the plaster base as

Roof covering is a matter of choice. The details at the right show the more common types of composition shingles available and their coverage per bundle. The detail below shows a cutaway view through the roof at the cornice. Roofing paper is first applied to the roof boards, then a starting strip of felt is laid along the cornice before shingles are applied. Finishing strips are used at the ridge and also along the joints over the hip rafters



	Coverage	Strip Size	Lap	Nails per Square
THICK THATCH	33 1/4 Sq. Ft. per Bundle	11" x 36"	2"	1", 1 1/4 lbs. or 1 1/2", 1 1/2 lbs.
STANDARD HEXAGON	50 Sq. Ft. per Bundle	11 1/2" x 36"	2"	1", 1 1/2 lbs. or 1 1/2", 1 3/4 lbs.
SUPER HEXAGON	33 1/2 Sq. Ft. per Bundle	12" x 36"	4"	1", 1 3/4 lbs. or 1 1/2", 2 lbs.
BLOCK TAB	50 Sq. Ft. per Bundle	10" x 36"	2"	1", 1 3/4 lbs. or 1 1/2", 2 lbs.
STANDARD 4 IN 1	50 Sq. Ft. per Bundle	10" x 36"	2"	1", 2 lbs. or 1 1/2", 2 1/2 lbs.
SUPER 4 IN 1	33 1/2 Sq. Ft. per Bundle	12 1/2" x 36"	4 1/2"	1", 2 lbs. or 1 1/2", 2 1/2 lbs.
THICK TAB	33 1/2 Sq. Ft. per Bundle	12" x 36"	2"	1", 1 1/4 lbs. or 1 1/2", 1 1/2 lbs.



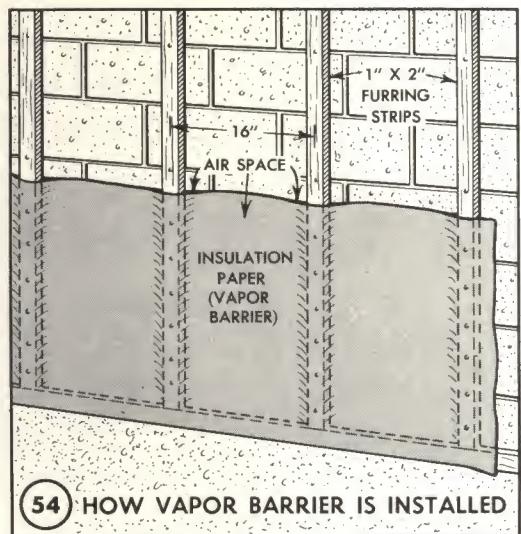
53

Walls are furred out with wood strips to provide dead-air space for insulation. Strips are nailed to walls or attached with fasteners.

shown in Figs. 62 and 62 B. When this is done, shallow bracket-type boxes are used. These are nailed to the wall, a wooden block being used to bring the bracket flush with the surface of the furring strips. Use masonry nails for this, or if their locations permit, they are nailed to a furring strip as shown in Fig. 62.

However, since there are no furring strips on the partition walls the conduit to boxes on these walls has to run down through the blocks, which are cut out to take the boxes as shown in Fig. 62 A. Fig. 62 shows how a shallow box is fastened to a furring strip when the line terminates in a box on an outside wall. Likewise, Fig. 62 B shows the installation when a line continues through a box on an outside wall. In either case, it will be necessary to chip a depression in the face of the block to recess the box flush with the plastered wall. When installing boxes set them so they will come flush with the surface of the plaster when it is applied. On the furred walls, you would allow for the thick-

Damp-proofing of walls can be done with a special paper that is applied over furring strips as shown below

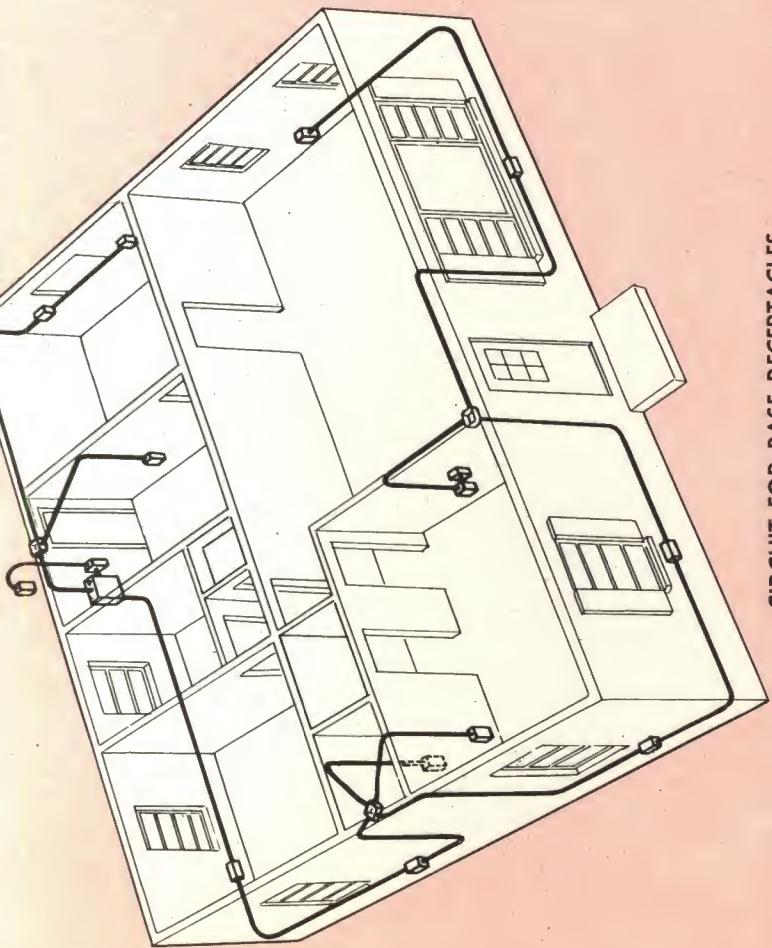


54 HOW VAPOR BARRIER IS INSTALLED

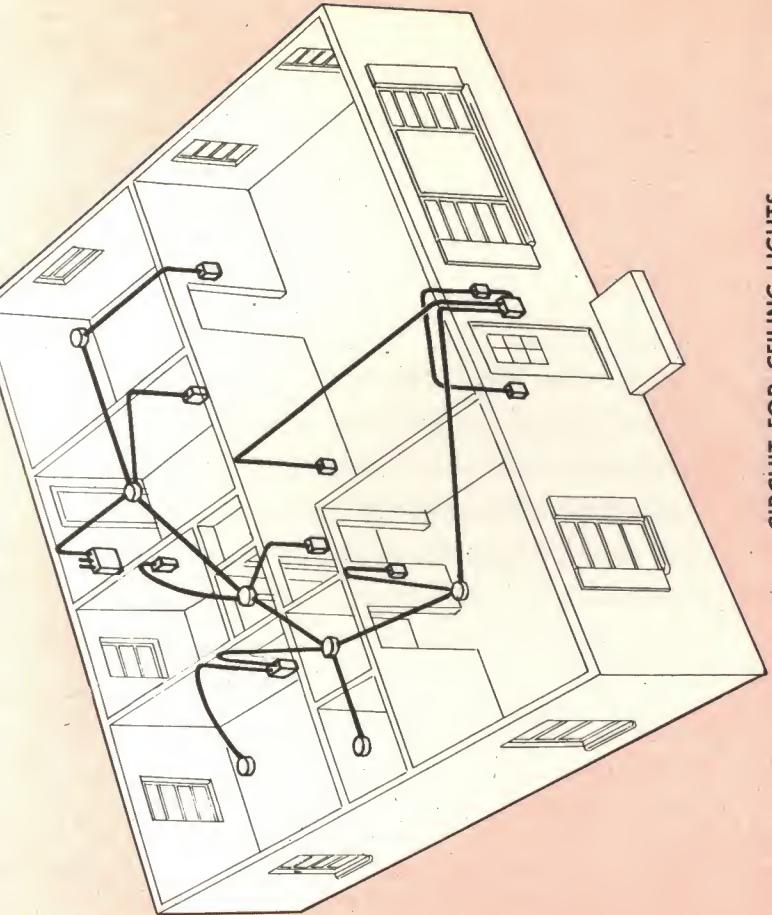
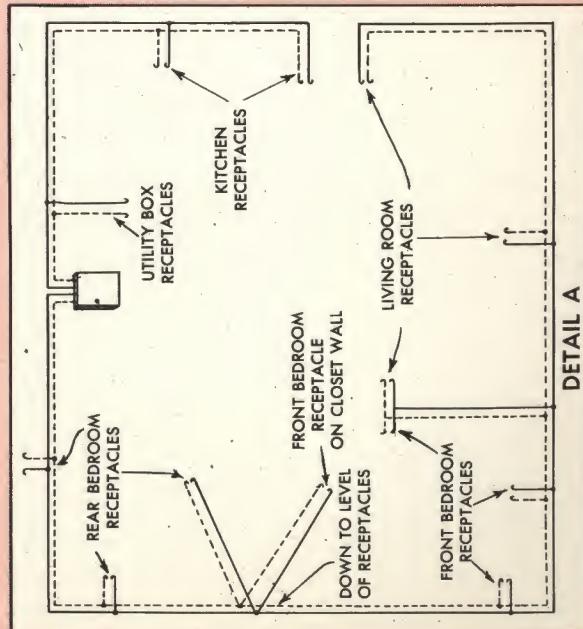
ness of the furring strips, plus the thicknesses of the plaster base and plaster. On partition walls only the thickness of the plaster has to be considered.

Fig. 56 shows how boxes are installed for ceiling fixtures. The bracket that supports the box is nailed to the underside of the joists. The box should be located so that its lower edge will come flush with the plaster. This may necessitate bending the supporting bracket slightly.

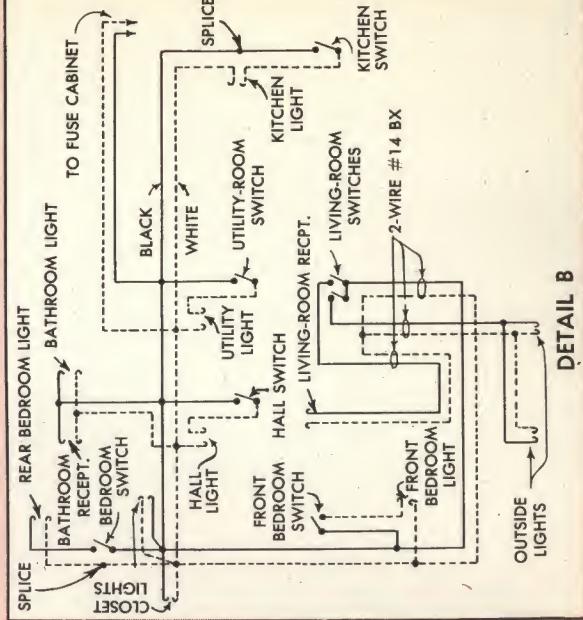
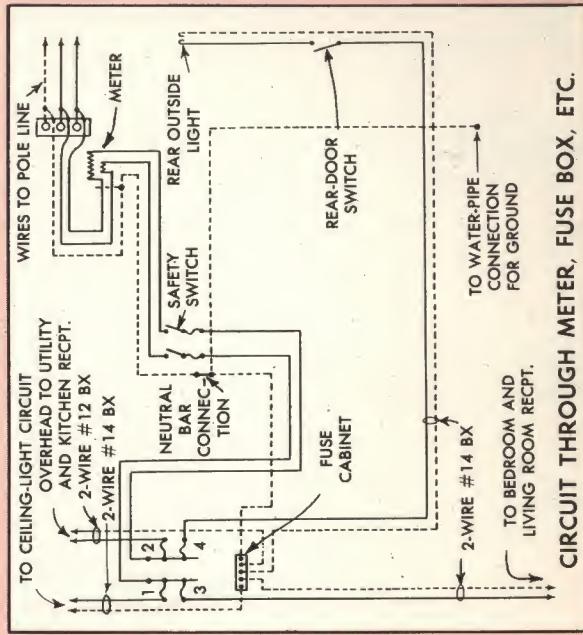
You may find armored cable a little difficult to cut, but a study of the details in Fig. 57 will enable you to master the trick. Just cut through one turn of the armor with a hacksaw, then twist it back and forth in opposite directions to break it. Once the armor is broken, clip the insulation and wires with regular cutters. Depending on the fixture or receptacle, be sure to remove enough of the cable so that when it is put in a box the wires will project sufficiently to make the connections. Wires that project 4 or 5 in. are suitable in most cases. A fiber bush-

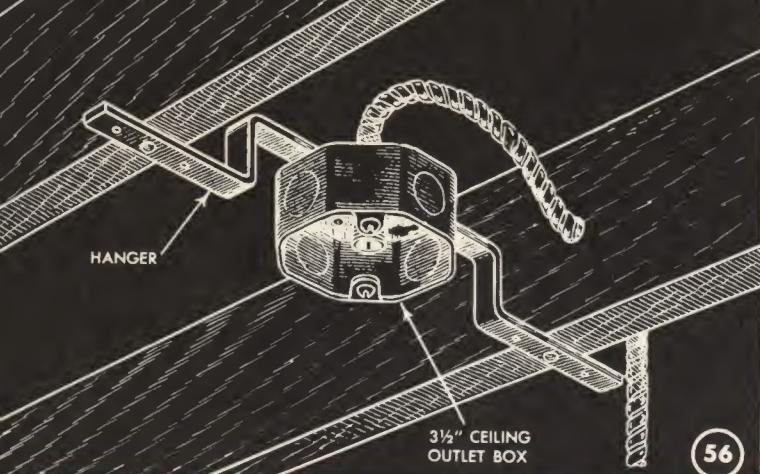


**CIRCUIT FOR BASE RECEPTACLES
(SEE DETAIL A)**

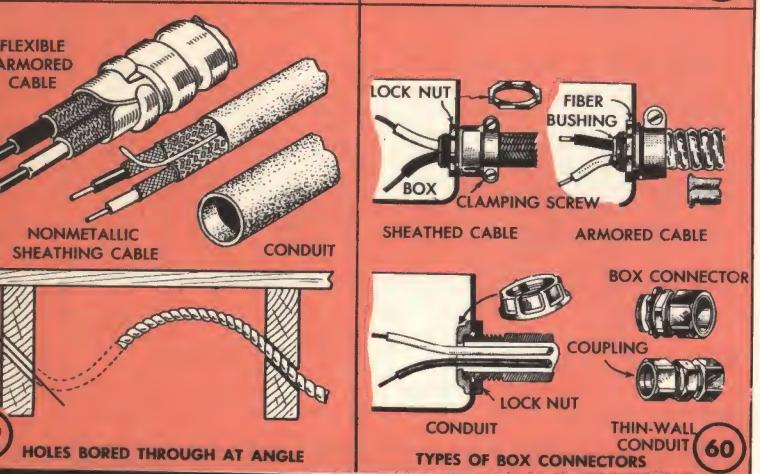
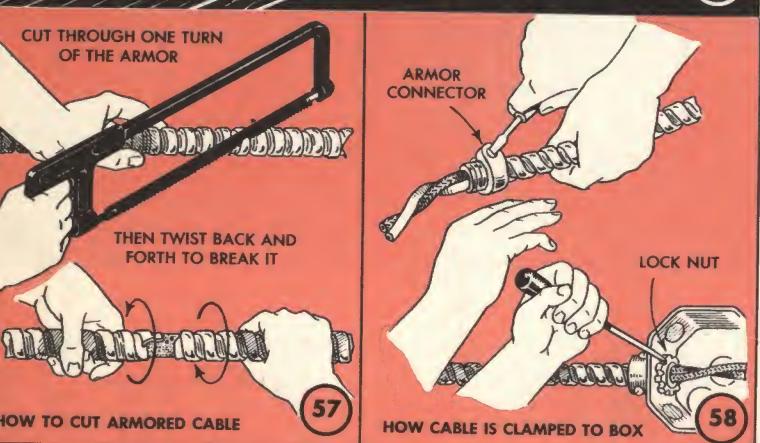


CIRCUIT FOR CEILING LIGHTS
(SEE DETAIL B)

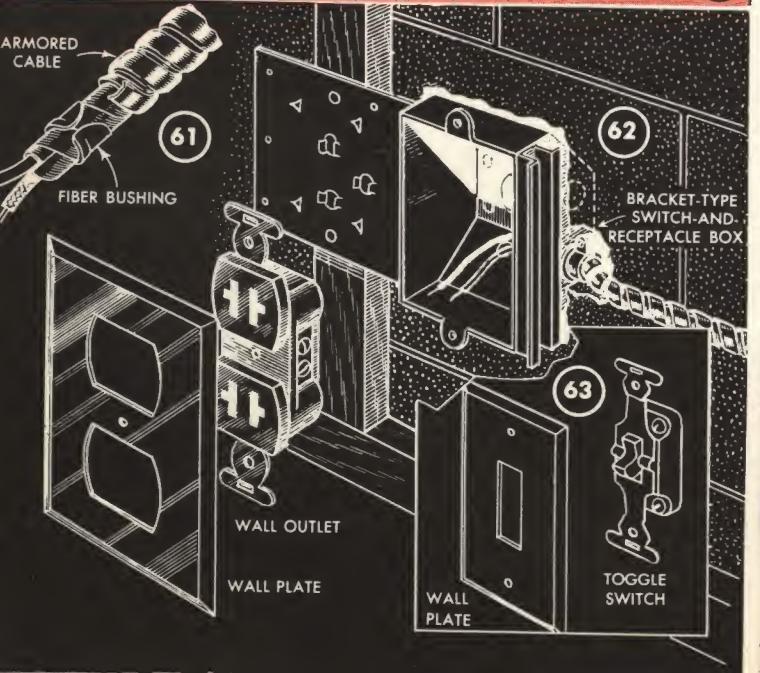




56



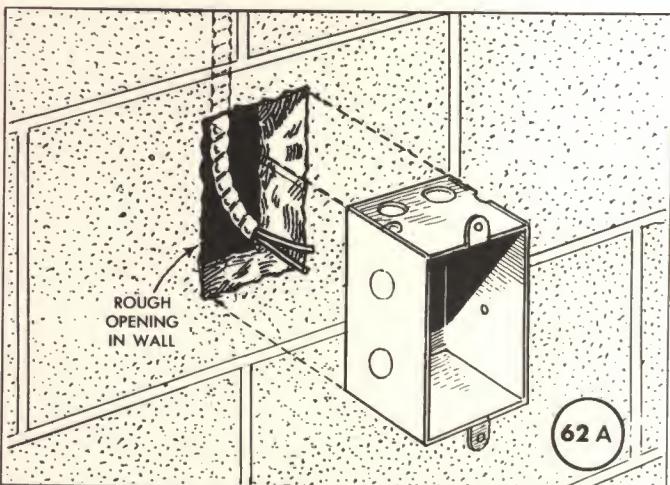
60



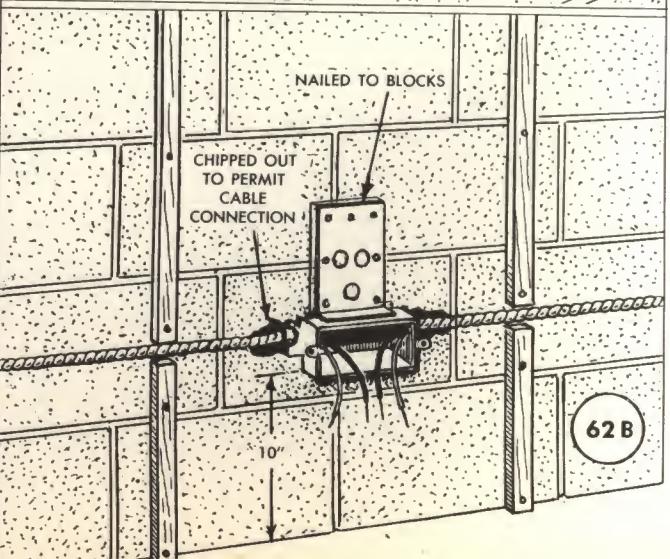
ing of the type pictured in Fig. 61 is pressed into the severed end of the cable to prevent any possibility of the rough end of the metal damaging the wire insulation. The cable is fastened into the boxes by means of a special connector, which is clamped to the end of the cable and then inserted into a knockout hole in the box as shown in Fig. 58. A special type of locknut is turned onto the threaded end of the connector inside the box. Fig. 60 shows the various connectors for other types of wiring. A look at Figs. 62 and 63 will enable you to assemble a wall outlet or receptacle and a toggle switch in a box.

Wherever it is necessary to splice or connect one wire to another, use the pigtail

Below, electrical conduit is run vertically through openings in blocks of partition walls and either vertically through the blocks or horizontally near the floor along their inner faces on all the outside walls



62 A

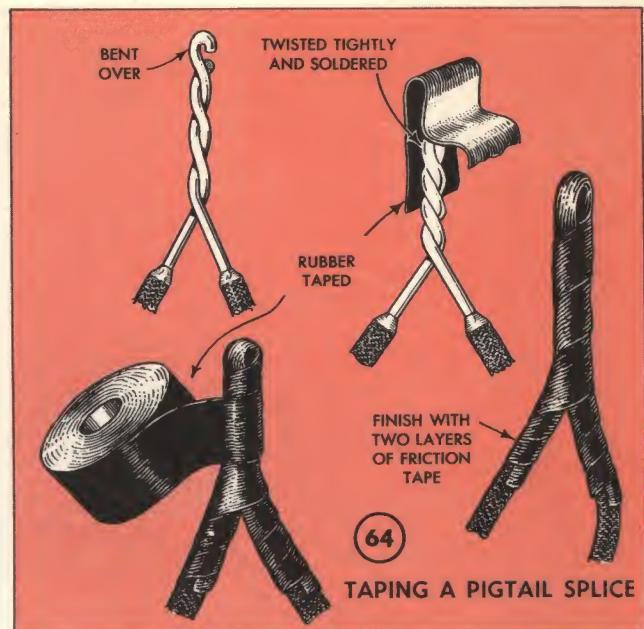


62 B

Wire Size No.	Max. Safe Load Watts—115 V.	Use Fuse Size Amps.
14	1725	15
12	2300	20
10	3450	30
6	5750	50

splice, which is shown in Fig. 64. After baring the ends of the wires, clean them by scraping thoroughly and then twist them together tightly. Notice that one wire is longer than the other and that it is bent over at the end. This is a safety measure to prevent it from puncturing the tape and possibly causing a short circuit. After twisting the wires, they must be soldered to assure a good electrical connection. The best way to do this is to make a small ladle in which to melt the solder and then merely dip the twisted wires into it. Complete the connection by taping the connection, both with rubber tape and friction tape. Fold the rubber tape over the end as indicated in the upper right-hand detail, and then wrap it spirally with one layer. Complete the connection by wrapping two layers of friction tape spirally over the rubber tape, bringing the friction tape well down over the insulation as in the lower right-hand detail.

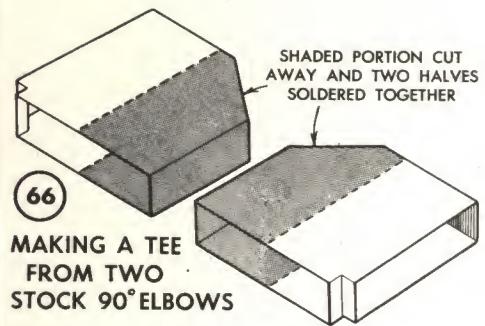
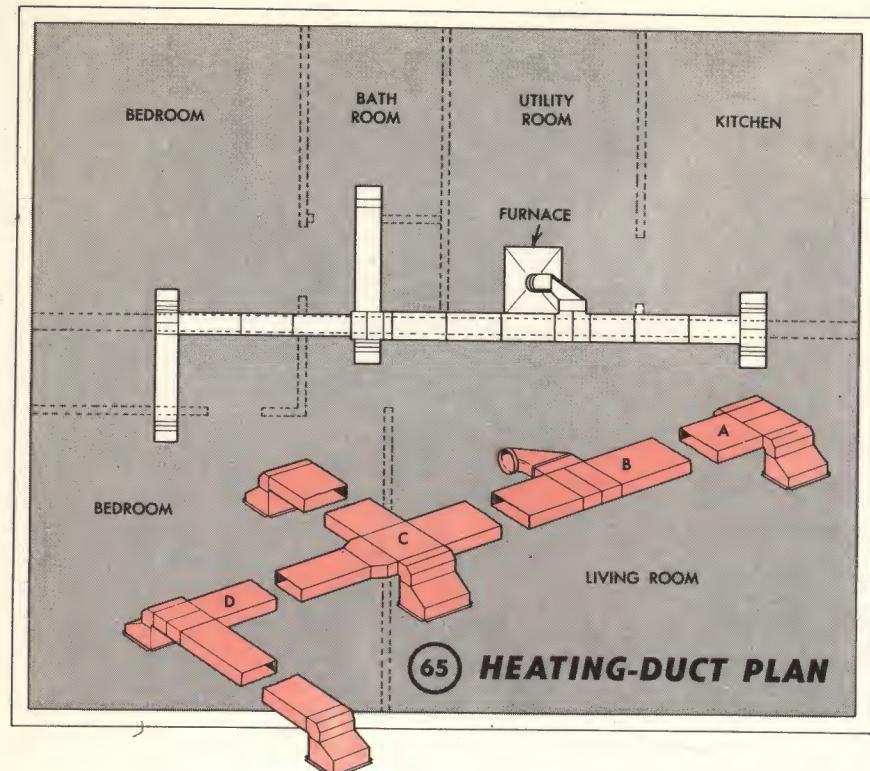
Be sure that all receptacles and switches are connected correctly before assembling them and putting on the wall plates, otherwise you may have a short circuit. When installing the receptacle boxes in the partition walls, set them in mortar to hold them firmly in place. After you have completed the wiring put in low-amperage fuses and turn on the main switch. If no fuses burn out, your job is connected correctly. It will be a good idea to check each wall receptacle and ceiling fixture, too. If everything checks, you are about ready for plastering, but before doing this, put in the hot-air ducts for the heating plant.



All electrical-wire splices are made with pigtail splices soldered and then taped with rubber and friction tape

INSTALLING THE HEATING PLANT

The hot-air-duct system, shown in the plan of Fig. 65, is of the simplest type, yet it is highly efficient. The entire system runs overhead with the outlet grilles located in the ceiling. As shown in the plan view, the system consists of a main line, which is located directly over the main bearing wall, and three branch lines that lead to the various rooms. Adapting the system to fit any forced-air furnace is just a matter of hooking the feed duct into the bonnet of the furnace. In some cases, it may be necessary to reshape the bonnet. For sake of clarity, the lower detail of Fig. 65 shows the system divided into four sections. Section A heats the kitchen and living room, section B is the feed duct from the furnace, section C takes care of the bathroom and hall, which also provides additional heat for the living room, and section D leads to the two bedrooms. All parts are standard fittings except the T-shaped fittings at the ends of sections A and D and the center of section B. These are special and can be made at your local tin



Hot-air heating ducts run overhead and terminate in registers located in the ceiling. All duct work is assembled from regular hot-air wall pipe, except one special fitting and the register boxes. T-shaped fittings required can be made from stock elbows cut and shaped as shown above

shop. If you wish to do the job yourself, the three T-shapes for sections A, B and D can be made from two standard wall-pipe elbows as indicated in Fig. 66. The four-way fitting in section C can be made in a similar manner by leaving all four sides of the improvised T-shape open. The ducts between section A-B and B-C are made of regular $3\frac{1}{2}$ x 12-in. wall pipe, while the duct between sections C-D is made of $3\frac{1}{2}$ x 10-in. wall pipe, a reducer boot being used at the four-way fitting of section C to take the smaller-size pipe. The reducer is a special fitting that will have to be made by your local tinsmith.

Fig. 67 details section A. Section D is similar except that one of the branch lines is longer, and the fittings are of smaller size for $3\frac{1}{2}$ x 10-in. wall pipe. Notice how regular floor register boxes of the type having bottom connections are used in an inverted position for the ceiling register boxes. The registers are standard 9 x 12-in. floor type. The register boxes are nailed to cleats, which, in turn, are nailed between joists.

Locate the boxes so that the flanged openings for the registers will come flush with the plaster surface. If necessary, the flanges on the boxes and registers can be drilled for small bolts to hold the registers in place. All joints in the duct work are tack-soldered, after assembly, and wrapped with asbestos paper, which is pasted in place.

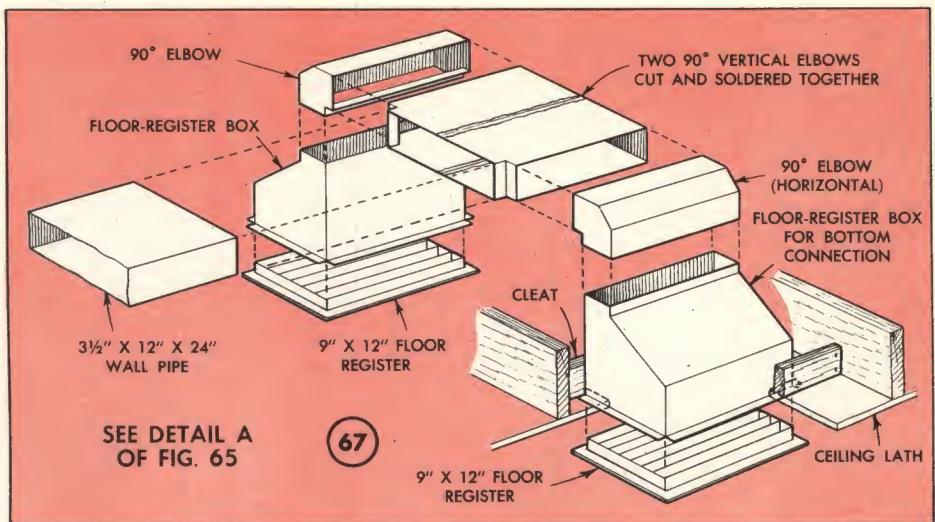
Assembly of section B is shown in the upper detail of Fig. 68, and section C is shown in the lower detail.

Installation of the furnace will depend on the one you purchase. It sets over the pit or well provided for it when the cold-air-return ducts were installed under the floor, the blower pulling return air from the pit, passing it through the furnace, where it is heated, and then forcing it through the hot-air ducts into the rooms. In this installation, return air passes through filters in the furnace before returning to the rooms.

PLASTERING

In most cases, this is no job for an inexperienced workman. If economy is an im-

The detail at the right shows the assembly of one of the branch lines. Notice how the floor register boxes are used in an inverted position in the ceiling. Boxes are mounted on cleats between joists so that openings come flush with surface of the plaster



portant factor, you can use any of the beautiful wallboards available as a substitute for plaster, using the boards or plank shapes on the walls and the tile shapes on the ceiling. With wallboard, you can do the work yourself and save the cost of labor for plastering. Also, if wallboard is used and you tire of it in a few years, or your finances permit a plastering job after two or three years, you can use the wallboard as a plaster base.

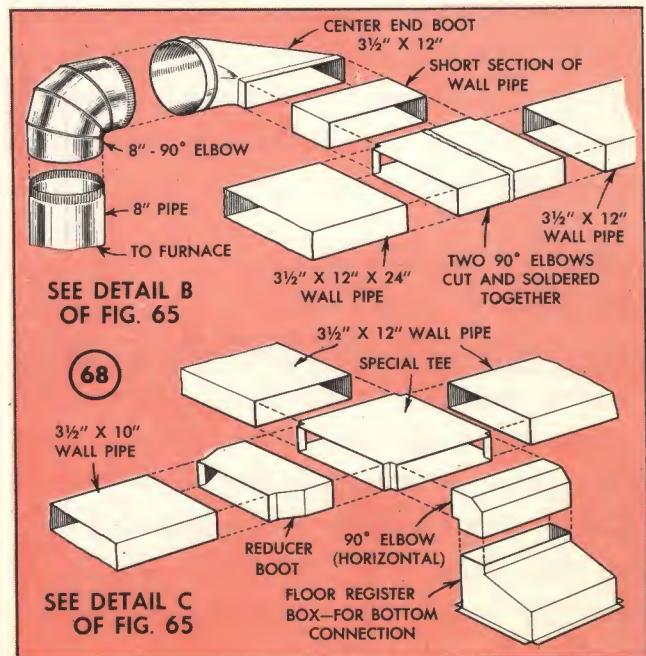
But, if a plaster job is preferred, you can save part of the labor cost by getting the walls ready for the plaster. The type of plaster base to use is a matter of choice. On the original house, plasterboard was used. There are two types of this board that can be used. One has a $\frac{3}{8}$ -in. core bonded with absorbent paper on both sides and is made expressly for application of gypsum plaster. The other type is a fiber board. Both are manufactured in sheets ranging in size from 16 to 24 in. wide and 32 to 64 in. long. These boards are easy to apply. Use 3-penny flat-head nails and space them 6 in. apart on the furring strips and 3 in. apart at the joints. Stagger the joints so that no two joints come on the same strip, one above the other.

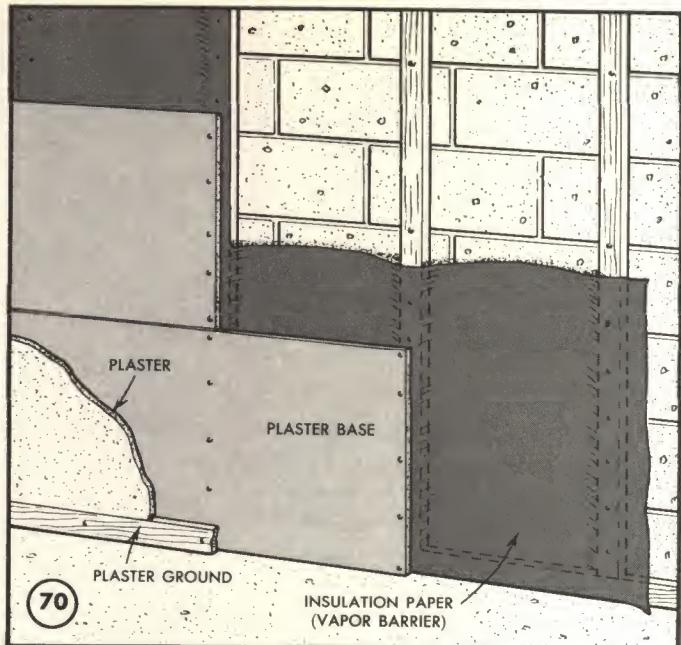
As a precaution against any possibility of cracks developing later where ceiling and walls meet, strips of expanded metal lath,

8 in. wide and bent to form an L-shape, are nailed entirely around the ceiling line of all rooms. Strips of metal lath also are applied wherever adjacent walls form an inside corner. The lath is nailed directly to the plasterboard and is pressed into the corner to embed in the plaster. These strips can be seen in place in the photo of Fig. 69.

Before lathing the kitchen walls, drop the ceiling line for the cabinets. While no detail

Detail below shows assembly of duct system at feed duct from furnace, and also detail of how duct size is reduced at center section for smaller wall pipe





Plaster is applied directly to the blocks in the partition walls as at left. Detail above shows the parts of an outside wall; furring strips, vapor seal, plaster base, etc.

is given to show this, it is easy to do. Just make L-shaped frames of a length and width to suit from 2 x 4s and then nail one end to a joist and the other to a furring strip on the wall. Apply the plasterboard over this. Your cabinets, of course, are mounted under this dropped portion of the ceiling. Next put in any plaster grounds that haven't already been installed. Fig. 70 shows one in place at the floor line. They also must be applied around all window openings as well as the door openings.

USING WALLBOARD INSTEAD OF PLASTER

If you decide to use wallboard instead of plaster, you have a selection of several different kinds of composition wall covering, many of which come already painted on one side. It also is possible to cut various designs in this material by means of a series of straight lines before applying it. The column at the left of Fig. 75 illustrates a few

examples. In addition to large plain pieces, this material is available in random plank widths and in tile shape. Fig. 75 shows several ways to treat the joints either to make them invisible or by working them in as part of the design.

INTERIOR TRIM

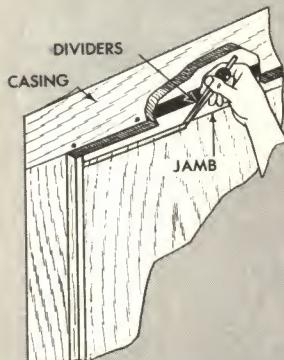
With the interior wall covering applied, you are ready to bring your new home to rapid completion by applying the trim around the doors and windows and putting on the baseboards. Fig. 73 shows the popular types of door and window-trim joints. Whichever style you choose is used on both the doors and the windows. The steps in trimming the windows, if you use the wooden type instead of metal, are shown in Fig. 72. First comes the stool followed by the casing, after which the apron at bottom of the window is applied and then the stop. Three popular methods of fitting the baseboards at the corners are given in Fig. 74.



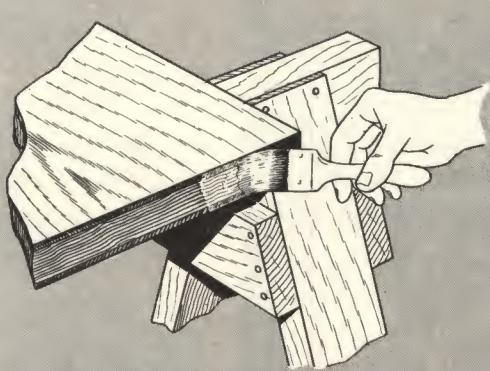
INSTALL AND PLUMB FRAME



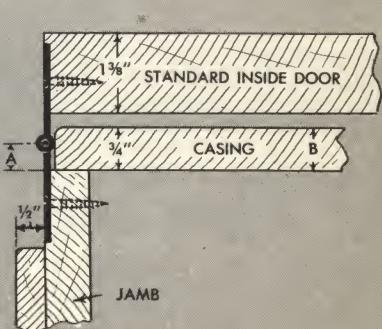
TRIM BOTTOM OF DOOR FOR ROUGH FIT

THEN SET IN FRAME ON BLOCKS
1/2" BLOCK

AND SCRIBE FOR ACCURATE FIT

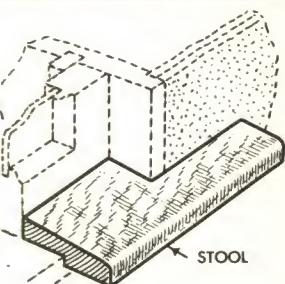


SEAL END GRAIN WITH SHELLAC

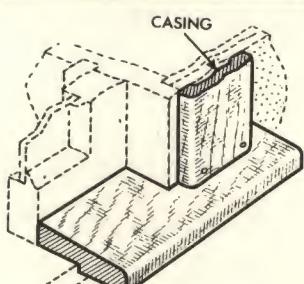


HOW DOOR IS HINGED

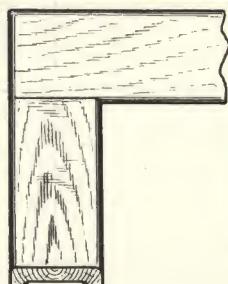
HOW INTERIOR DOORS ARE HUNG AND FRAMES ARE PLUMBED



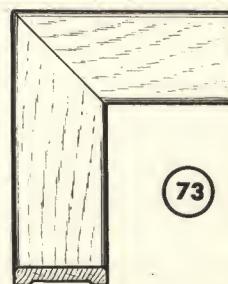
1st STEP



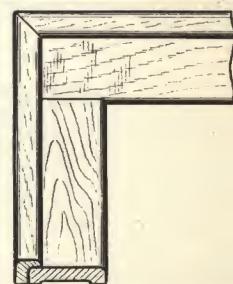
2nd STEP



SQUARE CUT

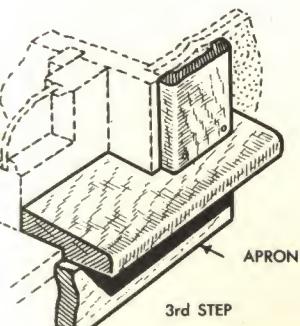


MITERED

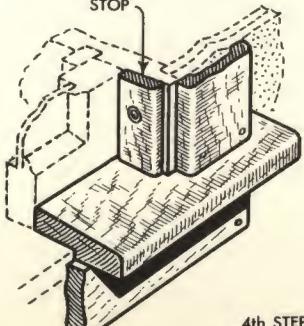


SQ. CUT, MITERED BACK BATTEN

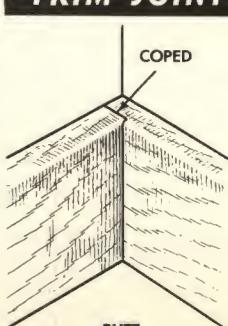
73



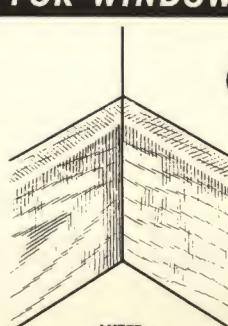
3rd STEP



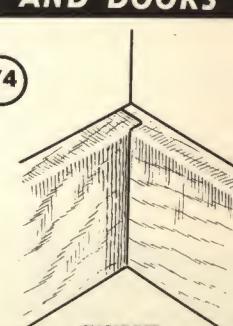
4th STEP



BUTT



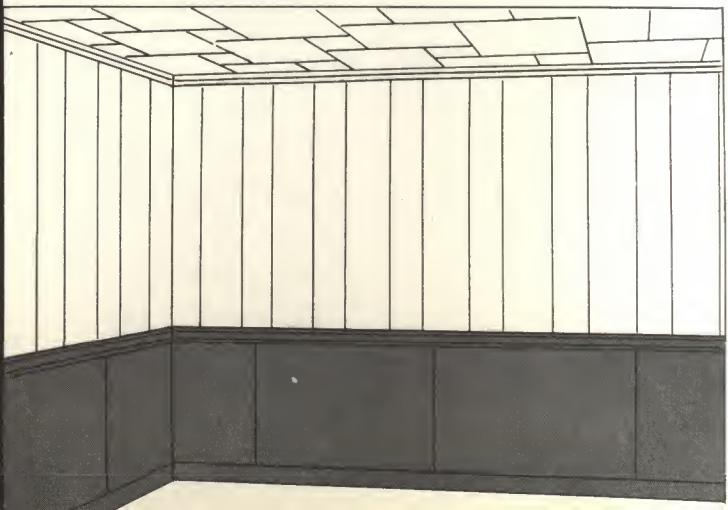
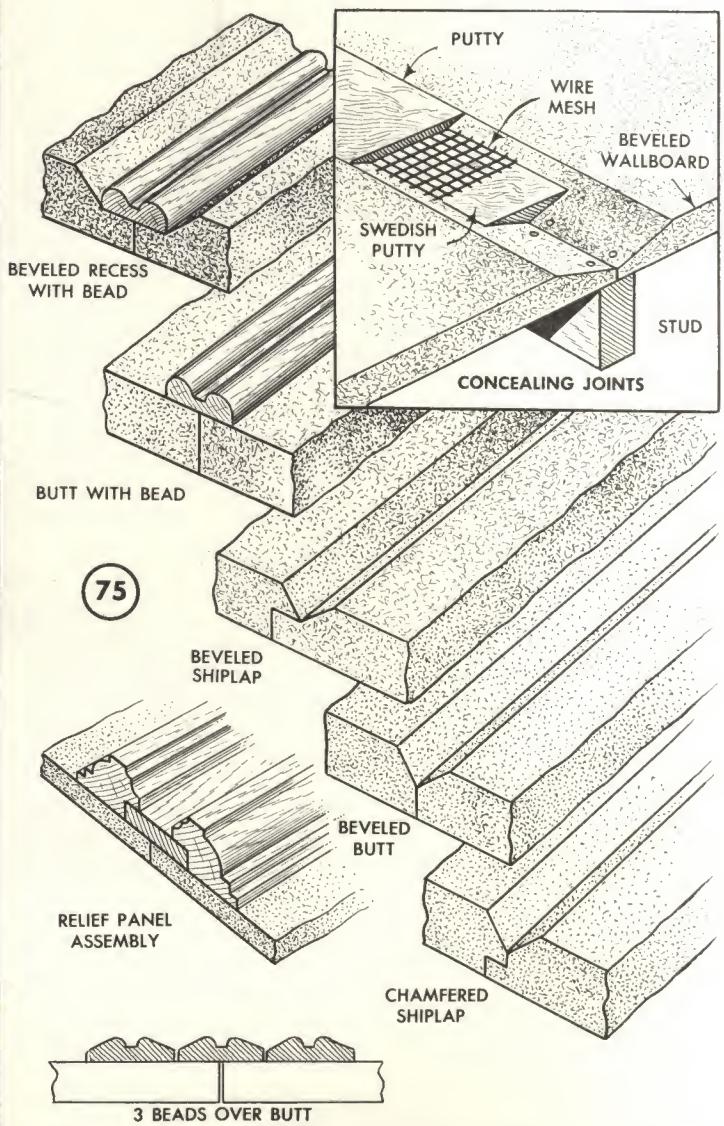
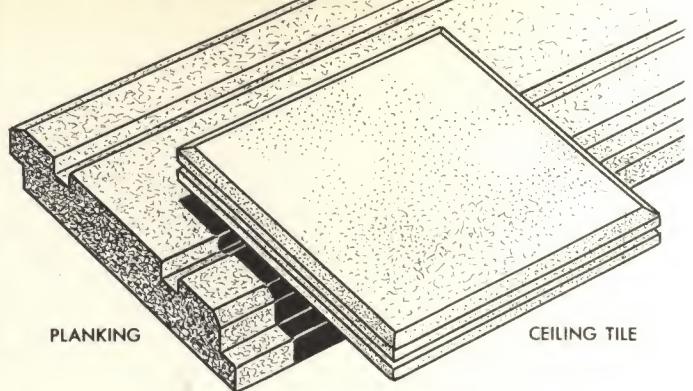
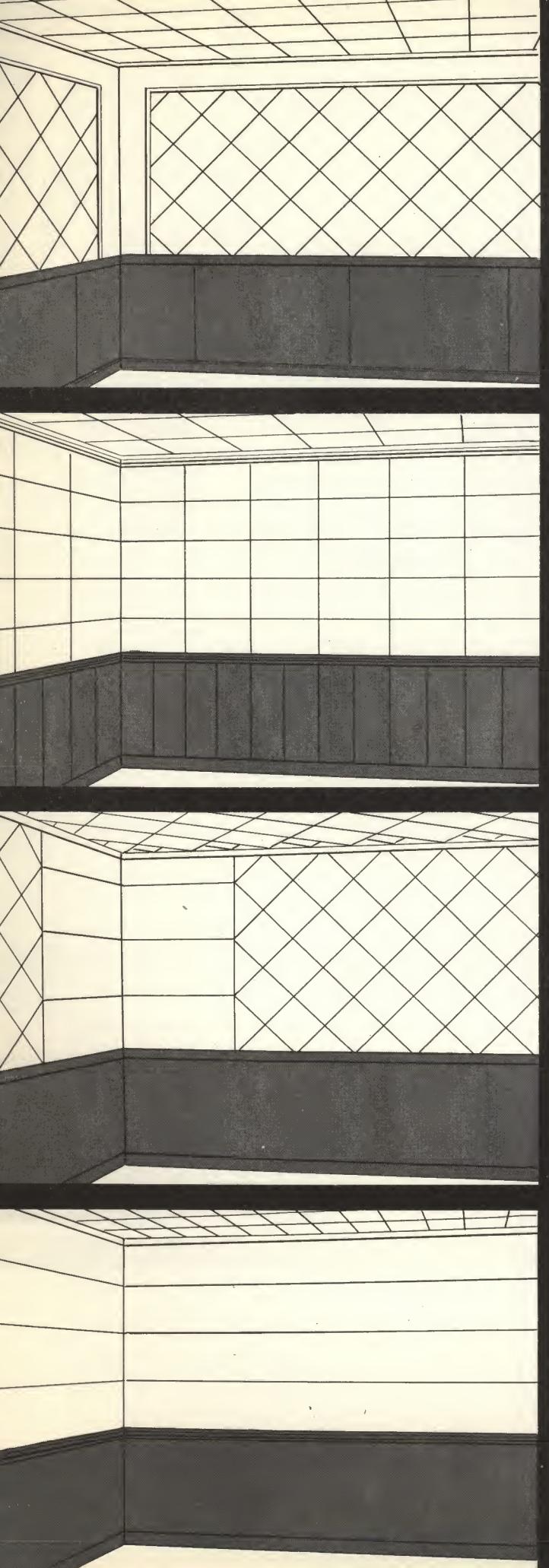
MITER



SHOULDER

74

TRIM JOINTS FOR WINDOWS AND DOORS





HANGING THE DOORS

Hanging the doors completes the home inside except for painting. Steps in hanging a door are given in Fig. 71. Only the last five steps apply now as the frames have already been installed.

You are done with the house except for stuccoing, painting or otherwise finishing the exterior surfaces of the outside walls. This subject is treated on the last page of this book.

BUILDING THE HOUSE OF BRICK

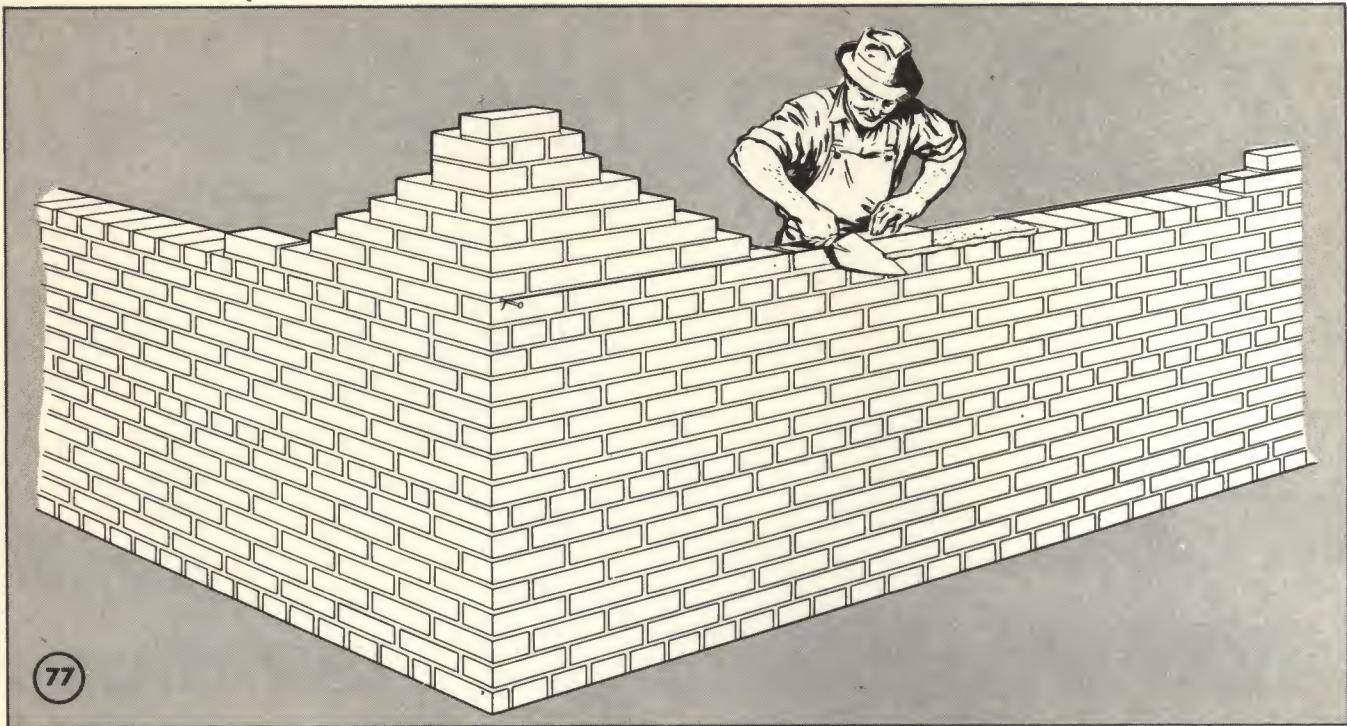
If you prefer the house built of material other than concrete blocks, you could use brick or some of the materials that are commercially available, such as imitation stone, etc. If any of the commercial materials are to be used, instructions from the manufacturer of the particular material selected should be consulted as to the procedure of construction.

In the view above, Fig. 76, you can get an idea of how it would appear built of brick. For this construction, there are several kinds of brick available. A house of this size would

If you don't care for concrete-block construction, the house looks well in brick as you can see above

appear to best advantage when built entirely of face brick, although it could be built with face brick only on the front, using common brick at the rear and sides, especially if the house were located fairly close between other homes so that the side walls would not be too conspicuous. Since face brick costs considerably more than common brick, this would be a factor well worth considering where economy has to be kept in mind. When face brick are used, only the exposed tier of the two-tier wall is made of these brick, common brick being used inside.

Space does not permit a complete step-by-step instruction for building the home of brick, but the following brief details and description should enable you to work out the necessary details. With the exception of the walls, construction is similar to the concrete-block house, using the same type of roof, partition walls, doors, windows, concrete floor and main bearing wall. In fact, the latter wall could be laid up of



Laying up a brick wall is easy if you do it as above. Keep the corners higher than the main wall

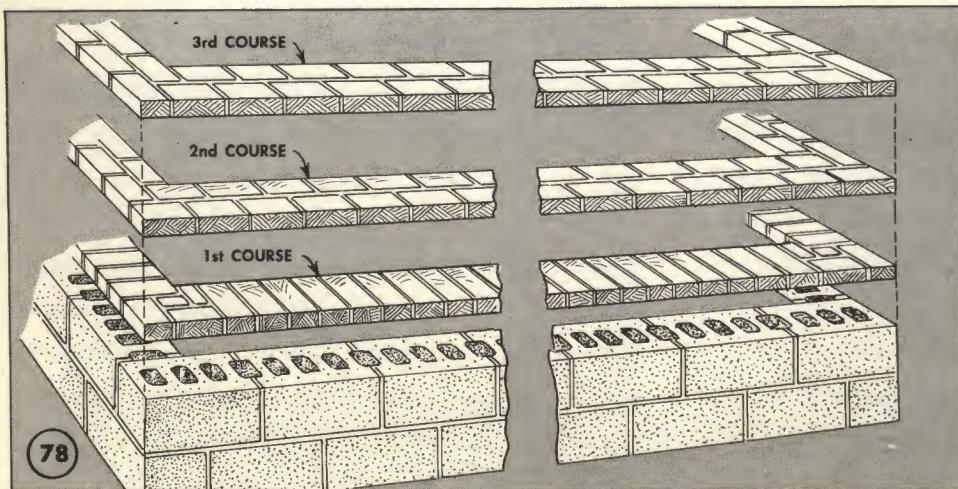
concrete blocks if desired as it would be hidden from view. The brick version of the house could be built with a basement, if desired, as described for the block house.

FOUNDATION

This is handled the same as for the block type except that 8-in. concrete blocks should be heavy enough for brick construction. If desired, you could use a 10-in.

poured-concrete foundation. Draintile and sewer system would be the same, as would the gas and water system. In fact, the entire construction would be similar except the outside walls.

Laying brick is no more difficult than laying concrete blocks and the procedure is similar, the main difference being that you have more pieces to handle per cubic foot of wall. Fig. 77 shows a brick wall, such as would be used, under construction, and Fig. 78 shows how to get started. Notice that the corners are kept higher than the rest of the



Starting a wall is done as shown at the left. First, is the bonding course, then five or six stretcher courses followed by a header course and more stretcher courses. Alternate the arrangement of the stretcher courses as shown by the second and third courses here

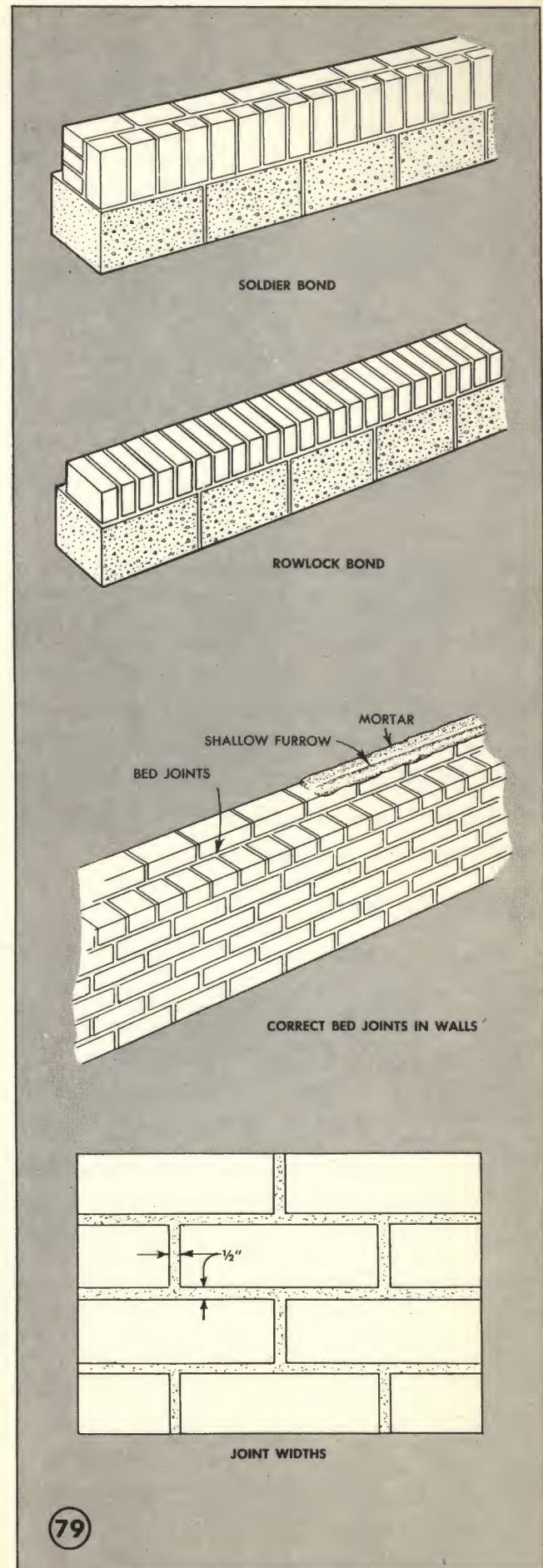
wall, and that a chalk line is used as a guide in laying the brick, just as in concrete-block construction.

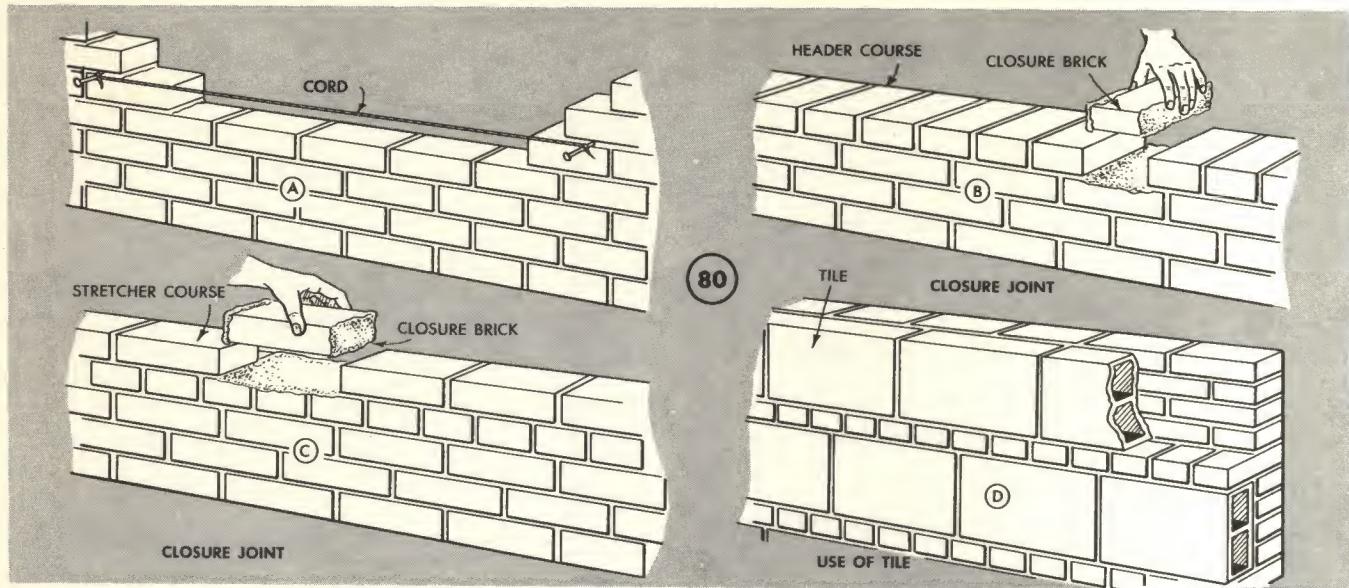
In brick construction, the first course, called a bond course, usually is laid at right angles to the foundation wall, after which every fifth or sixth course is laid at right angles to the wall and is known as a header course. This is done to tie the two tiers of the wall together because a solid brick wall of the type that would be used in this home is actually two walls in one. The courses laid between the header courses are called stretcher courses, in which the bricks are laid parallel with the wall. However, in starting the bond course there are two other types of these that could be used, mainly for sake of appearance. The two upper details of Fig. 79 illustrate these courses. The soldier bond, illustrated in the top detail, consists of setting the first course on end and then filling in behind them with courses laid flatwise. The second method, or rowlock bond, is similar to that shown in Fig. 78 except that the bricks are laid on edge. Either method is suitable and the one to use is a matter of choice. However, all bricks in the header courses are laid flatwise as are those in the stretcher courses.

After laying the bond course on the foundation, continue the wall by laying the stretcher courses, alternating the arrangement of bricks at the corners as indicated by the second and third courses in Fig. 78. The center and lower details of Fig. 79 show joint spacing and how mortar is applied. Like concrete-block walls, the joints can be varied slightly to level or lengthen a course of brick.

MORTAR

There are various mortar mixes for laying brick, each proportion of cement, lime





The steps above show important things to keep in mind when laying a brick wall. Detail D shows how clay or concrete tile can be used in a brick wall

and sand depending on its use. However, for the inexperienced bricklayer, it is better to purchase mortar cement made for this purpose and mix it with sand according to instructions on the bag.

LAYING BRICK

Much of the strength of a brick wall depends on how well the brick are bonded together with the mortar. Starting at the foundation, lay a bed of mortar about 1 in. thick, laying it only a foot or so in length so that you can place the bricks in it before it starts to stiffen. Continue this procedure the length of the wall. Then build up the corners six or eight courses high and fill in between them with the stretcher and header courses. When laying up the corners be sure you keep them plumb. The lower center detail of Fig. 79 shows how to bed the bricks in mortar on top of the previous course. Run the tip of your trowel down the center of the mortar bed to furrow it slightly. Coat one end of each brick before laying it, then butt the mortared end against the last one laid.

Tap it firmly into the mortar bed and be sure the vertical joint is filled with mortar.

Scrape the mortar flush with the surface of the bricks on the outside surfaces of the walls. You can do this with a swipe or two with the edge of the trowel. The joints can be left flush with the bricks or they can be formed. One type of formed joint is called a weather joint, and is designed to shed water from the wall. It is made by pressing in the upper part of the joint with the edge of your trowel, thus sloping the mortar toward the bottom of the joint. Another joint called a concave joint is formed with a rounded tool that presses the mortar inward to make a concave surface, and a third joint is known as the V-joint, which is formed with a V-shaped tool.

During dry weather it is a good idea to dampen the bricks just prior to laying them. They should not be soaked but just dampened by sprinkling. This will prevent them from absorbing too much moisture from the mortar, and also will remove brick dust that often interferes with a good bond between the brick and mortar.

A cord stretched tautly between the built-up corners as you lay each course will

help as a guide in keeping the wall level. However, you should check each course with a long level in addition to using the cord. The wall also should be checked vertically every few courses to see that it is being laid up plumb. Detail A of Fig. 80 shows the cord in use. Each end is wrapped around a nail pushed into the mortar joints.

The last brick laid in a course, where the ends are built up higher than the rest of the wall, is known as a closure brick. Detail B shows how a closure brick is laid in a header course, and detail C shows one being laid in a stretcher course. Notice that in the former case, both edges are covered with mortar and in the latter case, both ends are covered.

BRICK-AND-TILE WALLS

When putting up small buildings such as this house, costs often can be reduced by laying the walls with only the front tier of brick and using 4-in. clay or concrete tile for the inner tier. Detail D shows how this is done. Spacing of the header courses will be determined by the height of the tile. Best construction would require a header course between each row of tile, but some builders use them only between every second or third, depending on required strength of the wall.

DOOR AND WINDOW FRAMES

Door and window frames are handled in the same way as in the concrete-block version of the house. They are set in place, plumbed and then braced diagonally across the corners to keep them square. They also are braced vertically to keep them in position, after which the walls are built up around them.

SILLS AND LINTELS

Wooden, brick or precast-concrete sills can be used, preferably the latter. Precast

sills are set in a mortar bed on the last course of bricks at the beginning of the opening. When laying brick sills, use the rowlock bond and tilt the bricks downward slightly toward the front by thickening the mortar joint at the rear.

Lintels may be either wood or precast concrete, or even brick built in an arch, but unlike the concrete-block house, the wooden and concrete lintels will be visible in the brick house. Therefore, most builders prefer to use steel I-beams or heavy angle irons. In this case, brick are laid right on the ledges formed by the lower surfaces of the I-beams, thus completely hiding the beams. Of course, it will be necessary to chip the bricks down in thickness to fit around the beams. When angle iron is used, two lengths are required for each lintel. They are placed so that two lower edges are flush with the sides of the wall, thus producing a split lintel. Brick are laid on the ledges formed by the angle iron so that the iron is invisible except when looking upward from the window opening.

Plates are fastened to the upper ends of the walls by bolts embedded in the mortar joints, allowing the ends to project enough to go through the plates and take nuts and washers. The walls are furred inside for the plaster base, the strips being nailed into the mortar joints. Conduit for the electrical wiring will have to be run between the wall and plaster base, using shallow switch and receptacle boxes, and recessing the brick by chipping to bring the open sides of the boxes flush with the plaster when it is applied.

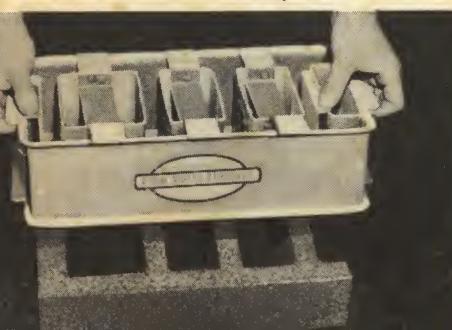
Also, it will be necessary to chip a recess in the kitchen wall, for the sink vent. The vapor barrier will be unnecessary in the walls of the brick house, but the barrier and edge insulation must be used in the floor.



First shovel concrete into form and jiggle to settle—



then firm by tamping with shovel and last, expel block



HOMEMADE CONCRETE BLOCKS

Although concrete blocks can be purchased in almost all localities, some builders may prefer to make them and thus save considerably on their cost. Block forms can be purchased, or you can make them from boards. Just make up a rectangular box of the required size and fit it with cores to form the openings in the block, tapering the cores from bottom to top for easy removal from the block. The top of the form is left open and some means of quickly loosening one side at the end should be provided. This will facilitate removal of the block. When forms are made of wood the inside surfaces should be impregnated with oil or grease to help prevent the concrete from adhering to the wood. Blocks of any desired shape can be made by inserting wooden blocks inside the form to create the desired shape.

The photos at the left show the steps in making a block with a commercial form. The same procedure applies to homemade forms. First, fill the form with concrete, settle it by jarring the form, then firm it by lightly tamping with the back of the shovel. The forms can be removed as soon as the concrete has set sufficiently so the blocks will hold their shape, which should be almost immediately. Newly made blocks should cure for at least 28 days in a shaded, sheltered place.

There are no standard proportions of mix for making concrete blocks as this depends on the desired strength. For most purposes, however, a mix of cement, 1 part, and aggregate, 8 to 10 parts, is satisfactory. The aggregate should not exceed $\frac{3}{8}$ in. in size. Just enough water should be added to make the mix plastic in consistency, but not wet or watery.

STUCCOING EXTERIOR WALLS

The exterior walls of the concrete-block house were stuccoed to give it a smooth finish free of joints or other slight irregularities. The stucco was applied directly to the concrete blocks as their rough surfaces provide a good tooth for the stucco. Like plastering an interior wall, applying stucco is a job that should be handled by an experienced workman, as it usually is applied in three coats, which must be put on smoothly and uniformly if a neat appearance is to result. Stucco can be colored almost any shade desired by the addition of pigments, which are made for this purpose.

House Built With No Experience

DEAR JANE LEE: I'd like to share with Aunty Reds our experiences while building our own home.

Although I was carrying our second child, I helped right up to the day I went to the hospital. With two fine boys, Aunty Reds should have no trouble.

As for experience, we had none. We built on a wooded lot. Many trees had to fall. This we did ourselves, digging out the roots and pulling the trees down with ropes. I almost cried when we had to take down a beautiful maple.

We built a one-story house. We even put in our own foundation. I mixed cement while my husband laid the block. Then came the floors, walls

and roof. When the plumbing and heating were in (we did this too), we moved in and are finishing as we go along.

As we think back, we laugh when we remember where we lost our first blood as we hit a finger with a hammer or dropped a board on a toe. The two of us did all the work and can honestly say we paid no labor on our house. Our little girl who was only 1½ years old carried nails and hammers.

We used a book as a guide which I would like to recommend to Aunty Reds, as we would never have made it without it. It is "Your Dream Home" by Hubbard Cobb and can be obtained from William H. Wise & Company, Inc., New York City.

One suggestion—know where you want every shelf, electrical outlet, and light switch. It will save you time, trouble and, most of all, money.

Best of luck, Aunty Reds. I know you will make it.

DREAMER.

I am eager to know what Aunty Reds decides to do. Perhaps she will tell us if the suggestions offered by our Column home builders have proved helpful.

